

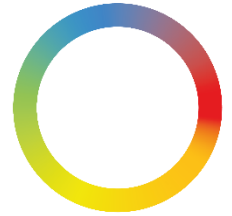
# Supporting tobacco cessation and the treatment of tobacco dependence

A handbook for pharmacists

2023



**Tobacco cessation**  
FIP Practice Transformation Programme on NCDs



# Colophon

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## Statement of intent

The purpose of this handbook is to provide evidence-based recommendations for clinical practice, derived from the most current and relevant research available. While adherence to these guidelines may improve clinical outcomes in many cases, they should not be considered a substitute for individualised clinical judgment. Clinicians are encouraged to tailor treatment strategies to each individual based on their unique nicotine addiction level, presentation, and available local management options.

The handbook will be reviewed when significant developments warrant an update. Although every effort has been made to ensure the accuracy of this publication, errors or omissions may occur. In such cases, corrections will be published in the online version of this document, which serves as the definitive version at all times. The updated version can be found on the FIP website.

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## Executive summary

According to the World Health Organization (WHO), tobacco use is one of the leading preventable causes of death worldwide, killing more than eight million people every year. Alarming, more than seven million of these deaths annually are directly linked to tobacco use, while 1.2 million are caused by “second-hand” smoke, or inhaling smoke from others smoking, every year. The vast majority of the world’s 1.3 billion tobacco users live in low- and middle-income countries (LMICs). In 2020, tobacco use was prevalent among 22.3% of the world’s population, with 36.7% of all men and 7.8% of all women worldwide consuming tobacco products. With such a high prevalence, it is clear that tobacco use represents a significant global health threat, causing widespread morbidity and mortality.

The negative effects of tobacco use on health are well documented. However, giving up tobacco and quitting can be a challenging process, but the journey towards a tobacco-free life can be made easier with the right support. Pharmacists have an important role to play in helping tobacco users quit and remain abstinent. Pharmacists’ expertise and accessibility ensure they are ideal providers of evidence-based advice, medication and support to those who want to break their addiction to and dependence on tobacco.

This handbook has been developed as a comprehensive and practical resource for pharmacists to support individuals in their efforts to quit tobacco, emphasising the critical role of pharmacists in providing comprehensive and coordinated care to patients seeking to quit. It covers the latest evidence-based practices, techniques and strategies to help our patients quit and not start again. The information contained in this handbook is practicable and tailored to the needs of pharmacists working in the field. By using the information and strategies outlined in the handbook, pharmacists can contribute to improving public health and reducing the burden of tobacco use on healthcare systems.

The handbook covers various aspects of tobacco cessation, including the burden of tobacco use on public health, the role of pharmacists in tobacco cessation and the treatment of tobacco dependence, and strategies for providing effective care to patients. It provides practical guidance on how to conduct patient assessments, design treatment plans and select appropriate medicines to manage withdrawal symptoms. The handbook covers strategies for providing patient education and support, monitoring and adjusting treatment plans, and referring patients to other healthcare professionals where necessary. It also highlights the importance of interprofessional collaboration, the integration of tobacco cessation services into routine primary healthcare, and the need to consider the impact of tobacco use on patients with underlying medical conditions.

There are many opportunities for pharmacists to be involved in tobacco cessation and, with the appropriate knowledge and skills (which are defined in the companion publication “[FIP knowledge and skills reference guide for professional development in tobacco cessation and other risk factors in NCDs](#)”), pharmacists are well-positioned to provide services to people who use tobacco, in collaboration with other members of the healthcare team, ranging from prevention and screening to management and treatment optimisation.

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The content of this handbook has been produced independently by the authors and editors, and has not been influenced by external parties or partners.

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# Foreword

The [FIP Practice Transformation Programme on Non-Communicable Diseases](#) (NCDs) aims to provide tools and strategic support to FIP member organisations to develop and implement pharmacy services with a sustained positive impact in the prevention, screening, management and treatment optimisation of NCDs, and improved patient outcomes and health systems efficiency and sustainability. The vision of the programme is to promote the global transformation of pharmacy practice and the quality improvement of services delivered to improve health outcomes and the quality of life of individuals living with NCDs.

The programme includes the development of practice-support handbooks, knowledge & skills guides, implementation guidelines and support, and training for competence development in each of the five main NCD areas ([diabetes](#), [mental health](#), [chronic respiratory diseases](#), [cancer](#) and [cardiovascular diseases](#)) and their risk factors, including tobacco use.

There are 1.3 billion tobacco users around the world and half of them will die from a tobacco-related disease.<sup>1</sup> Tobacco use has been reported as a major risk factor common to various NCDs, especially chronic respiratory diseases, cardiovascular diseases, cancer and diabetes — four of the five main United Nations-defined NCDs of concern. Worldwide, 14% of all NCD-related deaths of adults aged 30 years and over are attributable to tobacco.<sup>1</sup> The WHO Framework Convention on Tobacco Control, including Article 14 to treat tobacco use and dependence, has been included in the UN Sustainable Development Goal 3.<sup>2,3</sup>

Tobacco use cessation (and particularly smoking cessation) is one of the most important interventions to reduce the prevalence of NCDs. The WHO has incorporated smoking cessation as one of the six key cost-effective and high impact measures to help countries reduce demand for tobacco under the MPOWER framework.<sup>4,5</sup> For the WHO, health professionals, including pharmacists, have the greatest potential of any group in society to promote the reduction of tobacco use.<sup>6</sup>

In 1998, the WHO recognised the crucial role of pharmacists in aiding individuals to stop smoking and preventing potential users from starting.<sup>7</sup> In 2003, the FIP Council approved the [FIP Statement of policy on the role of the pharmacist in promoting a tobacco free future](#). The important contribution of pharmacists in tobacco use cessation services was also highlighted in the 2009 FIP publication [Curbing the tobacco pandemic: The global role of pharmacy](#) and the 2015 FIP publication [Establishing tobacco-free communities: A practical guide for pharmacists](#). This last publication described successful pharmacy interventions in tobacco cessation around the world and provided an overview of different tobacco cessation activities where pharmacists are involved. However, considering the global prevalence and burden of tobacco use, especially as a risk factor for NCDs, it is important that the role of pharmacists in this area is expanded and consolidated, and that professional organisations, including FIP, support practitioners in implementing and providing a range of services in this area. This is particularly important for those who live in LMICs, where the prevalence of tobacco use represents over 80% of the world's smokers and where the availability of cessation services for tobacco use is limited.<sup>4</sup>

Overall, through the provision of people-centred pharmaceutical services, pharmacists play a key role in healthcare systems, contributing through a holistic approach to ensuring healthy lives and well-being, as well as promoting more effective, rational and economical use of medicines by people suffering from NCDs. Pharmacists can contribute to the prevention of NCDs by supporting people to avoid and prevent risk factors, including tobacco use, as part of their routine practice.

In the context of the work of FIP on NCDs, and particularly as part of the FIP Practice Transformation Programme on NCDs initiated in 2021, it is proposed that this programme helps patients avoid risk factors for NCDs, such as tobacco use.

In summary, pharmacists can contribute to and support tobacco cessation through:

- Health promotion and education;
- Inquiring about tobacco use;
- Engaging with individuals who wish to quit tobacco use;
- Behavioural change support;
- Pharmacological interventions and treatment optimisation;
- Referral and interprofessional collaborative practice; and

- Helping to shape public policies.

This handbook presents successful examples of evidence-based tobacco cessation interventions by pharmacists from around the world that have led to improved health outcomes and economic benefits. We trust that these examples will inspire and provide valuable guidance to pharmacists who are committed to supporting individuals in their efforts to quit tobacco use.

FIP is committed to working with its member organisations and individual pharmacists worldwide to enhance and expand the role of pharmacists in tobacco cessation and the treatment of tobacco dependence, thus making a meaningful contribution to public health. We encourage you to take the time to read through this handbook and familiarise yourself with the resources and strategies it provides. Together, we can help our patients achieve a tobacco-free life, reduce their risk of developing NCDs, and improve their overall health and well-being.



Dominique Jordan  
FIP President



# 1 Introduction

## 1.1 The burden of tobacco use around the world

Tobacco encompasses a range of substances obtained through the processing of leaves from the *Nicotiniana tabacum* and *Nicotiniana rustica* plants. Tobacco can be used in a variety of ways other than combusted tobacco products, including electronic cigarettes and chewing tobacco. When tobacco is burned, it releases a toxic smoke that comprises approximately 7,000 chemicals, several of which are widely recognised to be detrimental to health, including toxic substances such as tar and nicotine, as well as carbon monoxide.<sup>8</sup> Nicotine, a highly addictive substance, is primarily responsible for the addictive effects of tobacco use, which is acknowledged by the WHO as a chronic and relapsing condition. Tobacco dependence affects approximately 1.3 billion people across the globe.<sup>9,10</sup>

Tobacco use is a major public health problem that imposes a heavy burden on individuals, communities and economies around the world. It is the leading cause of preventable deaths globally, contributing to a range of illnesses and premature mortality worldwide.<sup>9</sup> It is also a direct cause for NCDs such as lung cancer, cardiovascular disease and chronic obstructive pulmonary disease (COPD).

According to the WHO, tobacco use kills over eight million people every year. Approximately 1.2 million of these deaths are due to second-hand or third-hand smoke exposure caused by living in close proximity to chronic tobacco users.<sup>10,11</sup> Second-hand tobacco smoke refers to the smoke released from the burning end of a cigarette or other smoked tobacco products, as well as the smoke exhaled by the smoker.<sup>10</sup> Third-hand tobacco smoke refers to the residue of tobacco smoke that remains in rooms after smoking has stopped, as well as the residue that remains on clothes when people leave a smoke-filled environment.<sup>11</sup> Tobacco use not only impacts the health of users and those surrounding them, but also has a negative impact on the economic and social status of individuals and communities. The burden of tobacco use is particularly high in LMICs, where tobacco control measures are often weak, and the tobacco industry is highly influential. More than 80% of the world's tobacco users reside in LMICs.<sup>10</sup> For example, India is the second largest tobacco consumer, with 29% of all adults in the country using tobacco. Bangladesh also features alarming rates of tobacco use, with 35% of adults using tobacco products and 43% of people being exposed to second-hand smoke in the workplace.<sup>12</sup> The financial burden of addiction can be particularly challenging for tobacco users, as tobacco products are expensive and households may struggle to balance the cost of basic necessities with the cost of healthcare for tobacco-related illnesses.<sup>10</sup>

In addition to its direct health impacts, tobacco use also has significant economic and social impact.<sup>13</sup> The use of tobacco is a leading preventable cause of death and disease, and it is a major public health challenge that many countries around the world face. Data show that tobacco users spend about 5–10% of their disposable income on tobacco products.<sup>13</sup> This can impact not only tobacco users but their families as well, as it increases their financial burden and leads to lower quality of life. Tobacco use can affect one's social life as in many cases tobacco use has a negative stigma and can impact relationships and societal views of the tobacco user.<sup>13</sup>

Tobacco use not only poses serious risks to human health, but it also has a negative impact on the environment. Tobacco production and consumption have significant environmental impacts. Tobacco cultivation requires large amounts of land, water and pesticides, leading to deforestation and soil degradation.<sup>14</sup> Tobacco farming also involves the use of toxic chemicals that can pollute water sources and harm wildlife. The production of tobacco products also generates a significant amount of waste, from packaging and transporting the products to disposing of cigarette butts and other tobacco-related waste.<sup>15</sup> Cigarette butts are the most common form of litter in the world and can take years to decompose, releasing toxic chemicals into the environment. Tobacco products such as cigarettes, smokeless tobacco and e-cigarettes contribute to the accumulation of plastic pollution, with cigarette filters containing microplastics being the second largest source of plastic pollution worldwide.<sup>16</sup> Tobacco smoke also contributes to air pollution. The WHO estimates that the environmental impact of the tobacco industry is devastating, resulting in the loss of 600 million trees, 200,000 hectares of land and 22 billion tonnes of water, as well as 84 million tonnes of CO<sub>2</sub> emissions every year.<sup>17</sup> These impacts are particularly worrying in LMICs, where resources are already limited and needed for food production. Instead of using land and water resources to grow crops that could feed local communities, these resources are diverted to tobacco production.<sup>16</sup>

Not only is tobacco use a threat to the user but also to those around them, and the only proven effective way to eliminate the risks is tobacco cessation. Due to the highly addictive nature of tobacco, many users find it difficult to quit

on their own and require professional support from healthcare providers to successfully achieve cessation. Only 4% of users are able to quit on their own.<sup>10</sup>

The WHO has declared tobacco use a global epidemic that requires strong and sustained action from governments, health organisations and other stakeholders. In 2003, WHO member states adopted the WHO Framework Convention on Tobacco Control (WHO FCTC) to tackle the global tobacco epidemic,<sup>3,18</sup> which has been supported by FIP ever since. To date, 182 countries have signed and ratified this legally binding treaty in their efforts to address the unmet needs for tobacco control.<sup>10, 19</sup> The successful implementation of the WHO FCTC faces a major obstacle in the form of interference from the tobacco industry, particularly in LMICs.<sup>20, 21</sup> To combat this challenge, significant changes must be made to systems and structures. However, pharmacists individually or collectively through pharmacy associations can play a role in promoting tobacco control and cessation by mobilising the pharmacy profession to support WHO MPOWER measures.<sup>22</sup> WHO MPOWER strategies follow the guidelines of the WHO FCTC and have been shown to be effective in saving lives and reducing healthcare costs.<sup>10</sup> MPOWER is an acronym for:<sup>4, 5</sup>

- **M**onitor tobacco use and prevention policies;
- **P**rotect people from tobacco use;
- **O**ffer help to quit tobacco use (cessation);
- **W**arn about the dangers of tobacco;
- **E**nforce bans on tobacco advertising, promotion and sponsorship; and
- **R**aise taxes on tobacco.

The WHO report on the global tobacco epidemic 2019 shows that the implementation of tobacco control policies has increased, with five billion people, or 65% of the world's population, covered by at least one comprehensive tobacco control measure, which is more than four times the number in 2007.<sup>23</sup> Effective tobacco control measures, such as increasing taxes on tobacco products, implementing smoke-free policies, and providing access to cessation services, can help reduce the burden of tobacco use. However, concerted efforts are needed at the individual, community and government levels to address this global health challenge. Multiple countries have implemented and continue to fund campaigns against tobacco use, which include strategies such as pictorial warnings on tobacco products packaging and bans on marketing campaigns. Due to the fact that tobacco dependence is more prevalent in low-income countries, implementing higher taxes on products has been the most effective way of encouraging cessation. A 10% increase in tobacco prices has been shown to lead to a 4% decrease in tobacco use in high-income countries and a 5% decrease in LMICs.<sup>10</sup> It is important to continue efforts to reduce tobacco use in order to improve global health and reduce the burden of disease.

## 1.2 The range of tobacco and nicotine products and their health impact

There is a large range of tobacco products that includes traditional products such as cigarettes, cigars, roll-your-own cigarettes, pipes and water pipes. There are also newer products such as electronic nicotine delivery systems (ENDS), also known as e-cigarettes or vape pens and HEETS, also known as HeatSticks which heat tobacco in various units.<sup>24</sup> Other tobacco products include smokeless tobacco products such as chewing tobacco, dry snuff, moist snuff and dissolvable tobacco products.<sup>24, 25</sup> Regardless of the product, they always carry significant health risks.

**Cigarettes**, the most used tobacco product, are made from finely cut tobacco rolled in paper. Combustible cigarettes contain tobacco that is burned to produce smoke, which is inhaled. Tobacco smoke contains over 7,000 chemicals, of which 250 are known to cause harm, and at least 69 are known carcinogens.<sup>26</sup> Smoke can cause negative health effects such as exacerbated asthma symptoms and an increase in respiratory infections. It increases the risk of developing chronic diseases such as cancer, chronic respiratory diseases, and cardiovascular disease. The greater the exposure to smoke and tobacco products, the greater the risk of adverse health effects.<sup>13</sup>

**Cigars** are cylindrical-shaped tobacco products, usually larger than cigarettes, and made of an air-cured and fermented blend of tobacco leaves. The long ageing and fermentation process produces high concentrations of carcinogenic compounds. There are several types of cigars with different shapes and sizes, including cigarillos, double coronas, cheroots, stumphen, chuttas and dhumtis.<sup>25</sup> Regardless of the type, cigars contain tobacco and toxic chemicals which are damaging to health. The concentrations of toxins and irritants in cigars are higher than in cigarettes.<sup>25</sup> When a cigar is smoked, the tobacco is burned, producing smoke that is inhaled into the lungs. The smoke from cigars contains at least

69 known carcinogens, including toxic chemicals such as carbon monoxide, lead and heavy metals.<sup>26</sup> Cigar smoking has been linked to several serious health problems, including cancer of the mouth, throat, larynx, oesophagus and lungs.<sup>27</sup>

**Pipe tobacco** is a type of tobacco designed to be smoked in a pipe. It is usually sold in loose form and can come in a variety of flavours and strengths. There are several different types of pipe tobacco, including aromatic pipe tobacco, English pipe tobacco, Virginia pipe tobacco and Burley pipe tobacco.<sup>28</sup>

**Electronic delivery systems:** there are two types of electronic delivery systems, namely electronic nicotine delivery systems (ENDS) and electronic non-nicotine delivery systems (ENNDS). ENNDS function by heating a liquid to produce aerosols that the user inhales. These e-liquids can comprise a range of additives, flavours, and chemicals that can damage human health, but do not contain tobacco. ENNDS and ENDS may be hard to differentiate from each other since they frequently feature enticing flavours that appeal to youngsters and are commonly assumed to be non-addictive and safer than ordinary cigarettes. ENNDS are designed to be nicotine-free, but in reality, some e-liquids labelled as “zero-nicotine” have been discovered to contain nicotine upon testing.<sup>29</sup>

ENDS, also known as electronic cigarettes or e-cigarettes, are battery-operated devices that deliver nicotine in the form of an aerosol, which is then inhaled into the lungs. E-cigarettes operate by heating a liquid solution that typically includes nicotine, flavourings and other chemicals like glycerol and propylene glycol. As a result, the user inhales an aerosol, commonly called vapour, hence the term “vaping”. These feature different chemical compounds from traditional tobacco products.<sup>30</sup> Products differ according to functionality, shapes, sizes and the amount of nicotine and flavourings they contain. Some products include disposable devices; some resemble traditional cigarettes, vape-pens, and tank systems.<sup>24</sup>

The tobacco and related industries advertise and promote ENDS as a safer substitute for conventional cigarettes (because they do not contain tobacco), leading many users to believe that they are significantly less harmful to health than tobacco products, particularly cigarettes.<sup>24</sup> For instance, studies indicate that ENDS products are increasingly popular among young people in the United States, the United Kingdom and Australia,<sup>31-33</sup> with some research suggesting that using these devices may assist in smoking cessation.<sup>34</sup> Nevertheless, more comprehensive evidence is necessary to confirm this finding. Despite the perception that e-cigarettes are a safer alternative to traditional cigarettes, their potential health effects are still unclear and there is growing evidence of the harmful effects of ENDS (see Table 1).<sup>24</sup> E-cigarette or Vaping product use-Associated Lung Injury (EVALI) is a condition identified by the U.S. Centers for Disease Control and Prevention (CDC) in 2019 following a nationwide outbreak of severe lung disease associated with e-cigarette products or vaping in the United States. Symptoms of EVALI can be similar to those of other respiratory conditions and can include cough, shortness of breath, chest pain, nausea, vomiting, or fever. In severe cases, patients can require ventilation, and some cases have been fatal. While the number of EVALI cases decreased after peaking in 2019, the condition remains a significant public health concern.<sup>35, 36</sup>

Components such as the flavourings have not been studied and most likely contribute to the toxicity levels of the products.<sup>24</sup> Some short-term effects that have been noted with ENDS use include headaches, cough and irritation of the throat and mouth.<sup>34</sup> The health effects of e-cigarettes, such as their safety and long-term effects, are still being investigated and are the subject of ongoing research and debate. However, the WHO and other health organisations have expressed concern about the potential negative health effects of e-cigarette use.<sup>24, 37</sup> Some of the WHO’s key messages on ENDS are:<sup>24</sup>

- ENDS are addictive and not without harm;
- ENDS should be strictly regulated for maximum protection of public health;
- Children and adolescents who use ENDS can double their risk of smoking cigarettes; and
- Tobacco control efforts must remain focused on reducing tobacco use and avoid distractions created by tobacco and related industries.

Table 1. Some of the potential health effects of e-cigarettes

Health effects	Description
Nicotine addiction	E-cigarettes contain nicotine, which is highly addictive. <sup>37</sup> Nicotine in therapeutic doses can be beneficial to wean people off nicotine addiction through nicotine replacement therapy and help people stop smoking. <sup>38</sup> However, when used by children, adolescents or never-smokers, e-cigarettes can lead to nicotine addiction. <sup>24</sup> Significant discrepancy between labelled and actual nicotine concentrations have been identified, with many products containing more nicotine than indicated on the label, and even supposedly nicotine-free products contain nicotine. Also, some e-liquids contain more nicotine than regular cigarettes ever have. <sup>39</sup>
Respiratory problems	The aerosol produced by e-cigarettes can contain harmful chemicals such as heavy metals and volatile organic compounds, which can harm the lungs and airways, and increase the risk of lung cancer and diseases, such as chronic obstructive pulmonary disease, and exacerbate symptoms of asthma. E-cigarettes have been associated with respiratory problems such as coughing, wheezing and shortness of breath. <sup>37</sup>
Cardiovascular problems	The use of e-cigarettes can increase heart rate and blood pressure, which can lead to cardiovascular problems such as heart attacks and strokes. Daily ENDS use has been associated with increased risk of myocardial infarction. <sup>24</sup>
Chemical exposure	e-Liquids contain a range of chemicals, some of which are known to be harmful. <sup>24</sup> One example is the diacetyl found in flavoured e-cigarettes that when inhaled causes bronchiolitis obliterans, commonly referred to as "popcorn lung". <sup>40</sup>
Exposure to psychoactive substances	The presence of psychoactive substances (e.g., cannabidiol [CBD], synthetic cannabinoid receptor agonists [SCRAs] and tetrahydrocannabinol [THC]) has been found in some e-cigarettes. Vaping THC can potentially lead to impaired motor function, altered judgment, and issues with memory and cognition. It can also lead to addiction in some individuals. In addition, vaping THC has been linked to EVALI. <sup>41</sup>
Second-hand exposure	The aerosol produced by e-cigarettes can expose non-users to harmful chemicals (including nicotine and carcinogens), which is responsible for 1.2 million deaths per year. Second-hand vapour could raise the risk of heart disease and lung cancer. <sup>24</sup>
Increased risk of smoking	Children and adolescents who use ENDS are at least twice as likely to use traditional cigarettes and other tobacco products compared with those who do not use ENDS. <sup>24</sup>

Overall, e-cigarettes are not without potential health risks, and anyone who smokes and is considering their use as an alternative should be aware of these risks and talk to their healthcare provider, including their pharmacist, about quitting smoking and using other smoking cessation tools.

## 1.3 Nicotine and the addiction mechanism

Nicotine is a highly addictive stimulant substance that is found in the tobacco plant and it is present in various forms of tobacco products, including cigarettes, non-combusted cigarettes, smokeless tobacco (such as dip, snuff, snus and chewing tobacco), hookah tobacco and most e-cigarettes.<sup>42</sup> It is the primary addictive substance in tobacco that leads to repeated use and can cause physical dependence. When utilised, nicotine quickly reaches the brain and causes a release of adrenaline, which leads to increased heart rate, increased blood pressure and increased alertness.<sup>43</sup> Over time, the brain becomes accustomed to having nicotine, and withdrawal symptoms can occur when nicotine use is abruptly stopped. The withdrawal symptoms can include irritability, anxiety, difficulty concentrating and strong cravings for nicotine.<sup>44, 45</sup>

The pathophysiology of nicotine addiction involves changes in the brain that occur as a result of repeated nicotine exposure. Nicotine shares many similarities with other addictive drugs in terms of its molecular, neuroanatomical and pharmacological properties. It primarily exerts its effects by binding to specific nicotinic acetylcholine receptors in the brain, which in turn stimulates the release and metabolism of acetylcholine. Nicotine also stimulates the dopaminergic system, leading to increased dopamine concentration in the nucleus accumbens, a region of the brain associated with reward and reinforcement. This property of nicotine is believed to play a significant role in the development of behavioural changes and dependence on nicotine. In addition to the dopaminergic system, other neurological systems such as GABAergic, serotonergic, noradrenergic and brain stem cholinergic may also be involved in mediating the effects

of nicotine. The neurobiological pathway to nicotine dependence likely involves the attachment of nicotine to nicotinic acetylcholine receptors, stimulation of the dopaminergic system and activation of general pharmacological changes that contribute to nicotine addiction.<sup>46</sup>

Over time, the brain adapts to the repeated presence of nicotine and the release neurotransmitters, leading to changes in the brain's reward system that contribute to the development of addiction. Within one or two hours after stopping use of tobacco, the brain's reward system becomes altered and comes to rely on nicotine to feel normal, leading to cravings and withdrawal symptoms. Some populations are more prone to nicotine addiction; for example, people suffering from mental illness are twice as likely to smoke. Tobacco use is also more common in low-income minority populations.<sup>47</sup>

Nicotine withdrawal symptoms are physical and psychological symptoms that occur after quitting smoking or other forms of nicotine use. The most severe symptoms usually occur within the first week of quitting. These symptoms can range from mild to severe and can last for several days to several weeks. Common withdrawal symptoms for nicotine include:<sup>48, 49</sup>

- Cravings for nicotine;
- Anxiety;
- Irritability;
- Mood changes;
- Difficulty concentrating;
- Decreased heart rate;
- Insomnia or disturbed sleep;
- Increased appetite or weight gain;
- Depression;
- Restlessness; and
- Headaches.

The worst symptoms of nicotine withdrawal can vary from person to person, but some of the most difficult symptoms to manage include:<sup>50, 51</sup>

- Intense cravings for nicotine;
- Depression and anxiety;
- Irritability and restlessness;
- Difficulty sleeping and concentrating;
- Increased appetite and weight gain; and
- Headaches and nausea.

Quitting tobacco use can be extremely challenging as nicotine is a highly addictive substance and will illicit withdrawal symptoms.<sup>13</sup> Most people find it extremely challenging to quit on their own without the help of a healthcare professional or nicotine replacement products. According to the WHO, brief advice from health professionals can increase quitting success rates by up to 30%, while intensive advice increases the chance of quitting by 84%.<sup>6</sup>

*Brief advice from health professionals can increase quitting success rates by up to 30%, while intensive advice increases the chance of quitting by 84%.<sup>6</sup>*

Tobacco use is often linked to negative feelings therefore it is important to identify emotional as well as social triggers that increase cravings.<sup>13</sup> Quitting can be a challenge but is possible with the correct tools and support that are described in this handbook.

## 1.4 The benefits of quitting

The best way to reduce health risks and improve overall health is to quit smoking and stop using all tobacco products completely. Studies show that lung function and circulation improve within two to 12 weeks of quitting, and the risk of coronary heart disease drops by 50% after one year of cessation. The sooner tobacco use is stopped, the more health

benefits can be gained (Table 2). Moreover, families of tobacco users can also benefit from lower healthcare costs as second-hand smoke exposure can cause reproductive health defects in women and increase respiratory illnesses in children.<sup>13</sup>

Table 2. Health benefits of tobacco use cessation<sup>13</sup>

Time since quitting	Beneficial health effects
20 minutes	Heart rate and blood pressure decrease.
12 hours	Carbon monoxide blood levels reduce to normal.
2–12 weeks	Circulation improves and lung function increases.
1–9 months	Coughing and shortness of breath decrease.
1 year	Risk of coronary heart disease reduces to about half.
5 years	Risk of stroke is reduced to that of a non-smoker 5 to 15 years after quitting.
10 years	Risk of lung cancer is reduced by half and risk of mouth, throat, oesophageal, bladder, cervical and pancreatic cancers decreases.
15 years	Risk of coronary heart disease is reduced to that of a non-smoker.

Quitting tobacco use not only has a positive effect on health but also has a positive impact on social life, financial responsibility, and can decrease a person's healthcare burden. Quitting saves money yearly for the tobacco user. For example, on average, people who quit smoking in the United States save an average of USD 1,380–2,540 annually by quitting a pack-a-day habit. For heavier smokers, the savings from quitting can be even greater.<sup>52</sup> These extra funds can make a significant impact, especially in low-income areas where most smokers are located. Healthcare costs are significantly higher for smokers than for non-smokers. For instance, China reports smoking-attributable medical expenses to be about USD 45.28bn annually.<sup>53</sup> Quitting can also have a positive impact on someone's social life, as they will no longer need to go somewhere with available space to smoke or take smoke breaks.<sup>13, 52</sup>

## 2 Tobacco use and special risk population groups

Tobacco use is a significant public health problem as it continues to have a negative impact on both individuals and society. The multitude of serious health effects of tobacco are well documented, including an increased risk of heart disease, stroke and cancer. Tobacco use significantly increases the risk of acquiring chronic respiratory conditions and will exacerbate their symptoms. Exposure to second- and third-hand smoke can have detrimental health effects especially in high-risk populations including children, the elderly and people with pre-existing health conditions.

### 2.1 Cancer

Tobacco products contain a wide range of carcinogens. Prolonged use of tobacco can result in the impairment of cancer control genes, increasing the risk of developing numerous types of cancer, including lung cancer and oral cavity cancer.<sup>26, 54</sup> Individuals who continue to use tobacco after being diagnosed with cancer have less effective treatment outcomes.<sup>55</sup> Hence, tobacco cessation is essential in improving positive outcomes during cancer treatments, which is why many countries have launched tobacco cessation campaigns to promote awareness and encourage individuals to quit tobacco use.<sup>56-58</sup>

Pharmacists can offer comprehensive support to individuals with cancer who smoke or use tobacco products, including education on the health risks associated with tobacco use, behavioural strategies for quitting, and pharmacological interventions such as nicotine replacement therapies. This multifaceted approach can significantly improve tobacco cessation outcomes and ultimately lead to better health outcomes for individuals with cancer. Additional information about the role of pharmacists in cancer care can be found [here](#).

#### The mechanisms behind the link

There are at least 69 chemicals in tobacco products that are known carcinogens. The carcinogenic makeup of a product is dependent on its formulation. All tobacco products contain nitrosamines, which are carcinogenic compounds that are produced during the tobacco curing phase. The most notable carcinogenic nitrosamines are N'-nitrosonornicotine and 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone. There are multiple carcinogenic compounds additionally found in cigarette smoke as the high temperatures produce polycyclic aromatic hydrocarbons which can cause cancer and have negative effects on the kidneys and liver.<sup>54</sup>

The link between tobacco use and cancer is well established, and the mechanisms behind this relationship have been extensively studied. The harmful chemicals in tobacco smoke can cause DNA damage and mutations, leading to the development of cancerous cells. In addition, tobacco smoke contains carcinogens that can directly damage the cells lining the lungs and other organs. Tobacco use also weakens the immune system, reducing the body's ability to fight off cancer cells. Chronic inflammation caused by tobacco use further promotes cancer development.<sup>59</sup>

#### The consequences of continuing to use tobacco products

Long-term use of any tobacco formulation poses a risk of developing different types of cancer, including those affecting the lungs, oral cavity, larynx, pharynx, oesophagus, nasal cavity, pancreas, bladder, stomach, liver, kidneys, ureter, cervix, colorectum and ovaries. It can also cause acute myeloid leukaemia.<sup>26</sup> Continuing to smoke after receiving a confirmed cancer diagnosis increases the risk of side effects of oncological agents and may lower the effectiveness of some of these treatments, including erlotinib and chlorpromazine.<sup>60, 61</sup>

#### Quitting the use of tobacco products

Quitting the use of tobacco products is the only way to eliminate the cancer risk posed by tobacco and avoid complications that may arise during cancer treatments. A cancer diagnosis elicits mental and emotional reactions that may make it harder to quit tobacco use, which is why support from a healthcare professional is vital for cessation.<sup>62</sup> People living with cancer can discuss tobacco cessation options in collaboration with the pharmacist, caregivers and their oncologists.

## 2.2 Cardiovascular diseases

Tobacco use is one of the most prominent preventable risk factors for development of cardiovascular disease (CVD), premature death, and disability worldwide. Smoking is responsible for approximately 12% of deaths related to CVD globally.<sup>63</sup> The risk of coronary heart disease is 25% higher for females than for male smokers. Continuing to smoke after confirmed presence of CVD can impede efforts to treat or manage CVD.<sup>63, 64</sup>

Pharmacists should encourage patients with a confirmed diagnosis or those at risk of developing CVD to quit tobacco use. They should offer resources such as counselling and advice on obtaining nicotine replacement therapies. More information on the role of the pharmacist in preventing and managing CVD can be found [here](#).

### The mechanisms behind the link

Tobacco use contributes to CVD through mechanisms such as interfering with endothelial cell function, affecting the coagulation system and inducing vascular dysfunction. Studies have shown significant increases in total serum cholesterol, low-density lipoprotein and serum triglyceride levels in patients with a history of tobacco use. People with a history of tobacco use also showed a significant increase in white blood cell counts, which is directly correlated to the formation of certain atherosclerotic plaques.<sup>65</sup>

### The consequences of continuing to use tobacco products

The combination of tobacco use and CVD can interact with cardiovascular medicines. This can result in reduced effectiveness of medicines such as propranolol, flecainide and warfarin. Additionally, smoking has been shown to have numerous negative effects on cardiovascular health and can increase the risk of adverse events.<sup>60</sup>

### Quitting the use of tobacco products

Studies have shown that quitting tobacco use and continuing to stay tobacco-free can improve endothelial function.<sup>65</sup> Quitting is the only way to lower risk and minimise complications induced by tobacco use. After one year of tobacco cessation the risk of heart disease decreases by 50%.<sup>66</sup> People with CVD or who are at high risk of acquiring it should develop a tobacco cessation plan and talk to their cardiologist and primary healthcare provider about their options.<sup>65, 67</sup>

## 2.3 Chronic respiratory diseases

Individuals suffering from chronic respiratory diseases (CRDs) are extremely susceptible to the negative health effects of tobacco; notably products that are inhaled.<sup>62</sup> Smoking and vaping are risk factors for many CRDs, including chronic obstructive pulmonary disease (COPD) and asthma.<sup>24, 68</sup> Smoking can exacerbate respiratory symptoms such as shortness of breath, cough, sore throat and increased risk of infections.<sup>68</sup> In some countries, tobacco cessation campaigns are specifically aimed at reducing the risk of developing respiratory illnesses.<sup>69-72</sup> More information on the role of the pharmacist in CRDs is available [here](#).

### The mechanisms behind the link

The inhalation of cigarette smoke leads to oxidative stress within the airway epithelium, which can lead to limitations in airflow and be a direct factor in the pathogenesis of COPD.<sup>73</sup> Other mechanisms that affect the respiratory system include impairing ciliary function, leading to an increased risk of infection, and there are multiple components that are respiratory irritants such as acrolein, acetic acid, cyclohexanone and naphthalene.<sup>74, 75</sup>

### The consequences of continuing to use tobacco products

Continuing to smoke with a CRD will increase the risks of further disease complications, inhibit the effectiveness of treatments and increase risk of infection. The adverse effects of tobacco use are exacerbated in those with respiratory diseases and makes it difficult to manage symptoms. The effectiveness of medicines such as theophylline can also be reduced by tobacco use.<sup>60</sup>

### Quitting the use of tobacco products

Quitting tobacco use is the only way to eliminate the complications and the risk tobacco poses to CRDs. Individuals with CRDs should work together with their pharmacist, pulmonologist and primary care provider to develop a comprehensive tobacco cessation plan. This plan can help reduce the risk of exacerbations and complications associated with the condition.



## 2.4 Diabetes

People living with diabetes are particularly susceptible to the negative health effects of tobacco use. Studies have shown that tobacco use increases the risk of developing type 2 diabetes and complicates blood glucose control in those already living with diabetes.<sup>76,77</sup> Pharmacists have an important role to play in helping people living with diabetes to quit tobacco use. They can recommend over the counter products to help with tobacco use cessation, counsel on any medication and provide resources on where to receive additional cessation services. More information about the role of the pharmacist in diabetes prevention and management is available [here](#).

### The mechanisms behind the link

The exact mechanisms behind the link between tobacco use and diabetes are not fully understood. However, evidence suggests that exposure to tobacco smoke leads to oxidative stress and inflammation, which are known risk factors for the development of type 2 diabetes.<sup>78</sup> Furthermore, tobacco use may also affect insulin sensitivity, glucose metabolism and blood sugar levels, further complicating the management of diabetes.<sup>78,79</sup>

### The consequences of continuing to use tobacco products

Continuing to smoke while living with diabetes can have serious consequences. It increases the risk of developing severe complications, including cardiovascular disease, nerve damage, kidney disease and retinopathy. Diabetic peripheral vascular disease and neuropathy can also lead to diabetic foot infections or ulcers and potential amputation of the toes, feet and even limbs.<sup>80</sup> In addition, tobacco use also interferes with the effectiveness of certain diabetes medicines, making it more difficult to manage diabetes symptoms.<sup>79</sup>

### Quitting the use of tobacco products

Quitting tobacco use is the best way to reduce the risk of developing serious complications associated with diabetes. There are various resources available to help people quit tobacco use, including nicotine replacement therapy, behaviour change therapy, support groups and counselling. In addition, people living with diabetes should work closely with their healthcare provider, including the pharmacist, to develop a comprehensive plan for managing their diabetes and reducing their risk of developing complications.

## 2.5 Mental illness

The link between tobacco use and mental disorders is often overlooked. Research has shown that tobacco use is strongly associated with a range of mental health conditions, including depression, anxiety and substance abuse disorders.<sup>81</sup> People with mental illnesses are more likely to use tobacco than the general population, and mental illness has been found to play an active role in patients' inability to quit or resist relapse.<sup>81</sup>

### The mechanisms behind the link

The link between mental disorders and tobacco use is complex and is primarily associated with nicotine dependence, as this psychoactive and addictive substance can act as a mood enhancer and provide temporary relief from symptoms of anxiety and depression.<sup>82</sup> Over time, however, tobacco use can worsen these conditions and increase the risk of developing other mental disorders.<sup>83</sup>

### The consequences of continuing to use tobacco products

People with mental illness who continue to use tobacco products face a number of negative consequences. Tobacco use can exacerbate symptoms of mental illness and lead to increased hospitalisation rates, reduced treatment effectiveness and lower life expectancy. Tobacco use can also interact with psychotropic medicines, potentially leading to adverse effects, drug interactions and reduced medication efficacy.<sup>83</sup>

### Quitting the use of tobacco products

The link between tobacco use and mental illness highlights the importance of addressing tobacco cessation as part of mental health treatment. Tobacco cessation can improve mental health outcomes and increase the effectiveness of mental health treatments. In addition, tobacco cessation programmes can provide support and resources for people with mental illness who want to stop using tobacco products.<sup>84</sup> More information on the role of the pharmacist in mental health care can be found [here](#).

## 2.6 Adolescents/teenagers

Approximately one in 10 adolescents aged 13 to 15 years worldwide is a tobacco user.<sup>85</sup> Tobacco use beginning at a young age has the potential to raise the risk for the development of a multitude of illnesses later in life, such as cancer, cardiovascular diseases and diabetes. Exposure to second- and third-hand smoke also has the potential to increase risks of these illnesses and cause harmful effects. According to the US Centers for Disease Control, e-cigarettes have been the most commonly used tobacco product among US youth since 2014.<sup>86</sup> Adolescents are less likely to seek help for tobacco cessation due to legal age limits and the potential for repercussions.

Pharmacists should offer adolescents a safe space to speak about tobacco cessation and encourage them to quit by offering programmes and other resources that may benefit them. Several countries have implemented cessation campaigns and other protocols to limit accessibility and use of tobacco among adolescents.<sup>87-90</sup>

### The mechanisms behind the link

Although the long-term effects of tobacco exposure during adolescence are not yet fully understood, research has shown that the longer a person smokes, the greater their risk of developing a range of life-threatening illnesses. Furthermore, exposure to second-hand smoke can cause changes in endothelial cells, which can put adolescents who are exposed to it at risk of negative health effects. Therefore, it is important to discourage tobacco use among young people and to create smoke-free environments to protect their health.<sup>65</sup>

### The consequences of continuing to use tobacco products

Continued tobacco use among adolescents increases their risk of developing various associated health issues. For adolescents with asthma, tobacco use can lead to increased exacerbations and symptoms. Moreover, tobacco use at a young age is a primary risk factor for the development of COPD and lung cancer later in life. Therefore, the most effective way to reduce these risks is to encourage tobacco cessation among young people.

### Quitting the use of tobacco products

The sooner tobacco use is stopped the more time the body has to recover and the lower the risk becomes of acquiring tobacco-induced illnesses. Therefore, encouraging young people to quit tobacco use and supporting them in their efforts to quit is crucial for promoting long-term health outcomes and improving their quality of life. Follow-up by peer support groups may be a promising method to motivate youths to quit on their own.<sup>86</sup>

## 2.7 Pregnancy

Tobacco use rates during pregnancy vary widely depending on the country and population being studied. A study found that globally, the prevalence of smoking during pregnancy was 1.7%. Although this appears to be a relatively low prevalence, smoking during pregnancy is still prevalent in many countries such as Ireland (38.4%), Uruguay (29.7%) and Bulgaria (29.4%). The highest smoking rates during pregnancy were observed in the European region (8.1%), while the lowest rates were observed in the African region (0.8%).<sup>91</sup>

Tobacco use during pregnancy is a significant public health concern because it can have serious consequences for both the mother and the developing fetus. Tobacco is a known teratogen and using tobacco during pregnancy has been linked to birth defects and illnesses such as cognitive delays, malformations, preterm birth, low birth weight, stillbirth, sudden infant death syndrome and a range of other adverse health outcomes for the child.<sup>92</sup> The use of tobacco not only has the potential to harm the fetus but also the mother as it can cause maternal complications such as an increased risk of anxiety or depression, placenta previa and miscarriage.<sup>93,94</sup>

All pregnant women should be evaluated for tobacco use and offered cessation options at the beginning of and throughout their pregnancy.<sup>62</sup> Because of the risks associated with tobacco use during pregnancy, pharmacists should encourage pregnant women to quit tobacco use and offer resources and support to help them do so. In many countries, there are also public health campaigns aimed at reducing tobacco use among pregnant women and raising awareness about the risks associated with tobacco use during pregnancy.<sup>95-97</sup> A tobacco cessation intervention flowchart for pregnant women can be found [here](#).

### The mechanisms behind the link

The exact mechanism by which tobacco affects pregnancy is unknown. Studies suggest that tobacco may have negative effects on smooth muscle movements within the Fallopian tubes and may also affect the function of epithelial cells.<sup>98</sup>

Although the mechanism by which tobacco use impacts pregnancy is not well understood, it has been proven that the effects can be detrimental to both the mother and the fetus.

#### **The consequences of continuing to use tobacco products**

Continuing to smoke while pregnant increases risks for not only the baby but the mother as well. Tobacco use has the potential to increase the rate of congenital abnormalities, increases risks of complications and may contribute to factors involving infertility.<sup>99</sup> Continuing to smoke may also make certain medicines less effective, such as fluvoxamine and chlorpromazine.<sup>60</sup>

#### **Quitting the use of tobacco products**

Although quitting tobacco use is recommended prior to conception; quitting within the first 20 weeks of gestation has been shown to improve outcomes for both mother and child. There are significant factors that may make it difficult to quit tobacco use during pregnancy, such as an increase in stress, hormonal changes and mental health issues, which can increase cravings. Women should talk to their obstetrician or healthcare provider as they can provide options for tobacco cessation that are compatible with pregnancy.<sup>100</sup>

## **2.8 Older people**

Older adults are susceptible to a multitude of conditions that are common with age such as cardiovascular disease and cognitive disorders. CVD is a global leading cause of mortality with about 17.9 million deaths per year.<sup>101</sup> Tobacco has the ability to interact with multiple medicines and can complicate symptom management for some disease states.

Studies have shown some healthcare providers are less likely to offer tobacco cessation options to older patients.<sup>102</sup> Therefore, it is crucial that pharmacists encourage and emphasise options for tobacco cessation to older patients. There are many options to provide to this population, such as nicotine replacement therapies and counselling options.

#### **The mechanisms behind the link**

There are few studies that have looked at the exact mechanism long-term tobacco use has on the ageing population. Tobacco does alter metabolism and effectiveness of certain medicines, such as certain blood pressure and antidepressant medicines. It is crucial to report tobacco use to a healthcare provider.<sup>60</sup>

#### **The consequences of continuing to use tobacco products**

Older adults commonly use more prescriptions medicines and may take more over-the-counter medicines than younger age groups. Tobacco use may influence the efficacy of a multitude of these medicines. Older people are also more prone to changes in cognitive function and psychological changes that may make cessation more difficult.<sup>103</sup> Tobacco use is linked to a higher risk of cognitive impairment and premature death.<sup>104</sup>

#### **Quitting the use of tobacco products**

Tobacco cessation is the best way to prevent any further complications and development of any new health issues. Tobacco cessation at any age has the ability to improve health outcomes. Older adults should talk to their healthcare provider and family members or caregivers about options for tobacco cessation, including nicotine replacement therapies that can be tailored to fit any current medication regimens.

## 3 Pharmacy-led tobacco cessation interventions

In the early 20th century, a historical association between nicotine and pharmacies emerged when tobacco leaves were distributed in pharmacies for medicinal reasons. Over time, this practice evolved into the concept of “cigarette-selling pharmacies” due to the high demand and potent effects of nicotine. However, as the hazards and detrimental effects of smoking became evident and validated, the role of pharmacies shifted towards becoming “smoking cessation pharmacies”. This transformation occurred in the 1960s, transitioning the community pharmacy model from selling tobacco cigarettes to offering guidance and assistance in quitting tobacco use. This situation led to the development of the first US Food and Drug Administration-approved nicotine replacement therapy in 1984.<sup>105</sup>

For decades, pharmacists have played a key role in helping patients quit tobacco use and preventing future use. They offer counselling and monitoring, dispense medicines that aid in cessation management, and support individuals in overcoming their addiction to tobacco.<sup>105</sup>

Pharmacy-led tobacco cessation interventions, which refer to the role of pharmacists in assisting patients who want to quit tobacco use, can be found worldwide.<sup>105-111</sup> These interventions can range from brief advice to more intensive programmes, depending on the needs and preferences of the patient. Pharmacy-led tobacco cessation interventions are cost-effective in saving lives and reducing the burden of tobacco-related disease, including the prevention of NCDs.<sup>105, 110, 112, 113</sup>

Effective tobacco cessation strategies should primarily involve behavioural counselling to increase motivation and provide support during the quitting process. Behavioural interventions may be utilised in the form of advice, discussion, encouragement and other actions that help the patient succeed in their quit attempt.<sup>114</sup> Pharmacological interventions may also be recommended to help reduce the reinforcing effects of nicotine and alleviate withdrawal symptoms commonly associated with quitting. The key objective of a pharmacy-led intervention should be to prevent relapses and offer support to the individual in the event of a relapse, and encouraging them to make future quit attempts.<sup>115, 116</sup> It is important to note that motivation plays a significant role in the success of tobacco cessation, and a combination of both behavioural counselling and pharmacological approaches can significantly increase the chances of achieving long-term abstinence.<sup>117, 118</sup>

Promoting a tobacco cessation programme in a pharmacy can lead to more patients using the service. A Spanish study concluded that pharmaceutical care is a successful method for achieving tobacco cessation, with 43% of patients achieving total abstinence after 12 months, which is a better outcome compared with other healthcare settings. The authors of this study recommended that pharmacy tobacco cessation services should be systematically promoted at an institutional level to help reduce the negative health impacts of tobacco.<sup>119</sup>

The implementation of a community-based pharmacist-led tobacco cessation programme in Canada resulted in higher tobacco cessation rates among patients waiting for total joint replacement surgery compared with those who did not participate in the programme. Therefore, using these community resources is recommended and can be incorporated as a standard of care for individuals undergoing elective surgery.<sup>120</sup>

Another study conducted in Thailand demonstrated that community pharmacy tobacco cessation services, which integrated self-reports of exhaled carbon monoxide levels to measure patients’ tobacco cessation, were successful in helping patients quit tobacco use.<sup>121</sup>

In Nigeria, a study that focused on the attitudes and practices of community pharmacists in tobacco cessation showed that many pharmacists were willing to provide tobacco cessation services at their practice, but they might need specialised training to carry out this task efficiently.<sup>122</sup>

As mentioned earlier, the WHO has included tobacco cessation as one of the six MPOWER measures (i.e., offer help to quit tobacco use).<sup>4, 5</sup> This means that the WHO encourages offering support to quit tobacco use<sup>6</sup> and believes that health professionals, including pharmacists, have a remarkable potential to promote the reduction of tobacco use in society.

To help train health professionals in tobacco cessation, the WHO has created a self-learning course that is available online, free of charge for primary care practitioners and other health professionals.<sup>123</sup> This resource is particularly

helpful for pharmacists interested in providing cessation services as part of their routine practice. More information on training for primary care providers: brief tobacco interventions (WHO e-learning course) is available [here](#). The European Network for Smoking and Tobacco Prevention offers an [Accredited Curriculum on Tobacco Treatment](#). This online training programme provides healthcare professionals in Europe the opportunity to be trained in the latest evidence-based practices to help their patients quit tobacco use.

## 3.1 Brief advice

According to the WHO, brief advice refers to advice to stop using tobacco, usually taking only a few minutes, given to all tobacco users, usually during the course of a routine consultation or interaction with a physician or healthcare worker (see

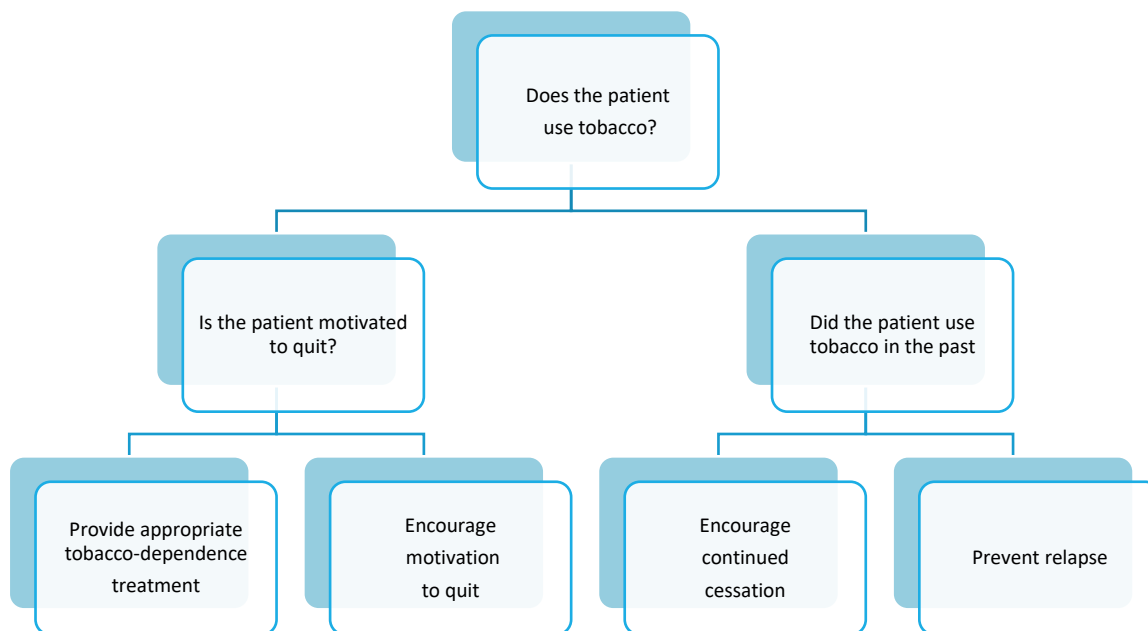
Figure 1). The goal of brief tobacco cessation advice is to get tobacco users to make quit attempts.<sup>124</sup>

Pharmacists in the community setting have a great advantage in guiding patients in their cessation attempts. They are easily accessible to the public and provide a spectrum of preventive services to help improve the health outcomes of patients. Pharmacists in the hospital setting also help patients by advising inpatients with special medical conditions or complications. Hospital pharmacists provide an advantage in terms of direct contact with patients' relatives and caregivers during hospitalisation. This is a great time for pharmacists to provide patients and their families with advice and necessary support in promoting cessation. Counselling on the importance of quitting, the impact on health outcomes and the prevention of other risks and diseases provides tobacco users with the resources they need to quit tobacco.<sup>105</sup>

Primary healthcare professionals, including pharmacists, can assist in helping patients practise tobacco cessation by asking them about their tobacco status. If primary care providers consistently enquire about tobacco use and encourage tobacco users to quit, they can potentially reach over 80% of all tobacco users annually. This approach can prompt 40% of users to attempt to quit and assist 2–3% of those who receive brief advice to successfully quit tobacco.<sup>13</sup>

Pharmacists can assist in changing people's behaviour by utilising different evidence-based tools designed for this purpose. Therefore, pharmacists must ask about tobacco use regularly and offer support. The simplest approach is the [Very Brief Advice \(VBA\)](#) or the 3As model (Ask, Advise, Act).<sup>125</sup> [VBA+](#) is a more extensive option that may be recommended by pharmacists who have the opportunity to suggest pharmacological interventions.<sup>126</sup> When more time is available, pharmacists should encourage their team to utilise the WHO's 5As and 5Rs approach to effectively deliver tobacco cessation interventions (see below).<sup>13</sup>

Figure 1. Algorithm for delivering brief tobacco cessation interventions<sup>13</sup>



### 3.1.1 Brief tobacco interventions for those who are ready to quit (5As model)

The 5As model (Figure 2) is a valuable tool that pharmacists can use to assist patients who are ready to quit tobacco use by offering advice within three to five minutes of a patient entering the healthcare setting. The pharmacist should enforce this model when any patient approaches the pharmacy counter to ensure the correct process is followed to guide the patient towards a positive behaviour change. The model includes five steps: Ask, Advise, Assess, Assist, and Arrange.

By using the 5As model, pharmacists can provide comprehensive tobacco cessation support to their patients, ultimately helping them to quit tobacco use and improve their health.<sup>13, 127</sup>

**Ask:** The “ask” step involves asking patients about their health behaviours. Pharmacists should routinely ask all patients at every encounter if they are tobacco users, and their answers should be documented. Questions such as “Do you smoke cigarettes?” or “Do you use any tobacco products?” are good examples on how pharmacists can provide implementation of this approach. In addition, countries should consider documenting tobacco use status in all medical records to encourage communication about cessation between healthcare practices.<sup>13</sup>

*Pharmacists should routinely ask all patients at every encounter if they are tobacco users.*

**Advise:** The “advise” step involves providing clear and concise advice on the behaviour that needs to be changed and why it is important. Pharmacists should encourage all individuals about the importance of quitting and, when talking to them, ensure that their advice is clear, strong and personalised. Clear advice can include statements such as “It is important that you understand you should stop using tobacco now, and I can help you” or “Occasional or light tobacco use is still considered dangerous for your health”. A firm tone can show that the pharmacist intends to help the patient and build patient-provider credibility. An example can include “As your pharmacist, I need you to know that tobacco use can cause many future problems and the best way to protect your health is to stop now. We are here to help you”. Personalising the advice is another way to gain trust from an individual. The advice can be patient-specific based on their demographics, health concerns, or social factors. For example, adult women may be more likely to participate in tobacco cessation than men due to increased fertility risks. Many of the patients a pharmacist may encounter will have different health concerns, so encouraging them with advice tailored to address their needs can help promote cessation. Social determinants such as

*All people who use any form of tobacco should be advised to quit. The advice should be clear, strong and personalised.*

having children or financial considerations may be motivators to quit, and formulating individualised questions and statements is highly recommended. In other cases where a pharmacist is not able to construct advice for the patient, it may be helpful to ask “What do you not like about being a smoker?” to allow them to self-reflect, and for the pharmacist to gain more understanding to continue guiding the conversation.<sup>13</sup>

**Assess:** The “assess” step allows the pharmacist to determine how ready the patient is to make a quit attempt. Here the pharmacist should ask the patient two essential questions: “Would you like to be a non-tobacco user?” and “Do you think you have a chance of quitting successfully?”. These questions will focus on patient’s desire and ability to quit. If the answer to question one is “unsure” or “no” and the answer to question two is “no” this implies the patient is not ready to quit, and the pharmacist should intervene using the 5Rs method (see below). If both answers are “yes” then the patient is ready to begin with a quit attempt, and the pharmacist should implement questions from the “assist” and “arrange” examples.<sup>13</sup>

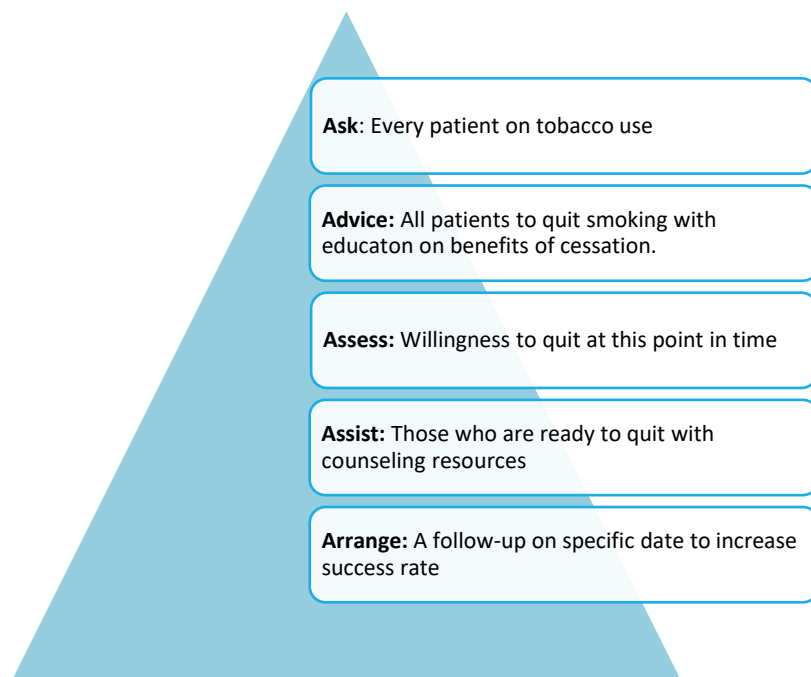
**Assist:** The “assist” step involves working with the patient to develop a quit plan that they are willing to commit to. Pharmacists can aid the patient in developing a quit plan, provide useful counselling, social support, supplementary materials and other helpful resources, and recommend the use of approved medication if needed. Pharmacists can assist patients in developing a quit plan using the STAR method.<sup>127</sup> This method allows the patient to:

- Set a quit date within two weeks;
- Tell their family, friends, and co-workers about quitting and ask for additional support;
- Anticipate the challenges that may occur during the quit journey; and
- Remove all tobacco products from the patient’s environment to create a smoke-free space.

Pharmacists should also provide counselling that focuses on helping the patient identify and practise cognitive and behavioural coping to manage any dangerous situation as activities that may increase the risk of tobacco use or relapse. Pharmacists should also provide information on the benefits of cessation and social support groups to encourage quit attempts. Pharmacists should communicate with care and concern and reassure patients that they should speak about their cessation journey. Pharmacists are encouraged to have a list of services that are readily accessible to provide guidance when approached by a patient. These can include resources such as quitlines, tobacco cessation clinics, or support groups.<sup>13</sup>

**Arrange:** The “arrange” step involves establishing a follow-up plan to monitor the patient’s progress and provide ongoing support as needed. Pharmacists should organise an in-person or telephone contact with the patient for a follow-up visit, and referral to a specialist may be considered if additional assistance is needed. The initial follow-up contact needs to be scheduled during the week before the quit date, and a second can be completed within a month after the quit date. The pharmacist should help all patients recognise and anticipate current or future challenges and the additional resources and support available. The pharmacist should also evaluate the patient’s medicines usage and address any concerns and plans for their next follow-up contact. Patients who remain abstinent should be congratulated to promote encouragement. In case of relapse, pharmacists should remind patients they can learn from their experience and apply it towards future quit attempts. If necessary, pharmacists may also suggest additional intensive treatment or specialists for more support.<sup>13</sup>



Figure 2. The 5As model to help patients ready to quit<sup>13</sup>

The 5As model is designed to be a brief, effective, and practical approach to behaviour change. It is often used in primary care settings and other healthcare environments to help individuals improve their health behaviours and prevent or manage chronic conditions. The pharmacist is encouraged to practise this model at every patient interaction. If time is limited, the pharmacist should consider asking a couple of questions from each category to address any concerns.<sup>13</sup>

This model is also a simple way to approach any patient who comes to the pharmacy who has been exposed to second-hand smoke. Ask all non-tobacco users if anyone around them smokes, and then educate them to avoid the exposure. Determine the patient's willingness to reduce vulnerability and assist them in transforming their environment into a smoke-free space. Lastly, ensure arranging a follow-up contact after one week to support the patient.<sup>13</sup>

#### Brief advice example 1: Tobacco use and hypertension

**Client (C): Hello!**

Pharmacist (P): Hello, welcome in! How can I help you today?

**C: I am here to pick up my medication.**

P: I see here your medication is for high blood pressure. If you don't mind me asking, do you smoke cigarettes or use any tobacco products?

**C: Thank you for asking. I smoke cigarettes every other day. I know that smoking is not good for me, so I am trying to cut down.**

P: You are right. I am glad to hear you are trying to cut down. Smoking is a big risk factor for cardiovascular disease. Continuing to smoke can worsen your high blood pressure and may also cause further damage and complications to your heart. I would strongly recommend you quit smoking. On a scale of 1 to 10 (where 1 is low and 10 is high), how motivated are you right now to stop smoking completely?

**C: At the moment I think I have a 9 on motivation to quit smoking. Could you explain me how is smoking related to my high blood pressure?**

P: This is great. I see that you are interested in quitting smoking and here in the pharmacy we can help you. The nicotine and chemicals you inhale when you smoke can damage to your heart and blood vessels, causing a sticky substance called plaque to build up in your arteries. Tobacco use has been proven to increase your blood pressure, so I need you to know that quitting now is the best way to improve your future health outcomes.

**C: I didn't realise my smoking was connected to my high blood pressure. Does smoking cause any problems with my medication?**

P: Absolutely. Tobacco use can interact with your medicines causing them to not work as expected. This situation can worsen your blood pressure but can also cause potential hospitalisation. If your blood pressure cannot be controlled you may need higher doses of medicines in the future, which may result in an increased risk of side effects.

**C: So, are there other things I can do to help protect my heart and control my blood pressure?**

P: Yes. In addition to not smoking, you could also adopt a healthy lifestyle. This can be done by eating healthy foods, maintaining a healthy body weight, and participating in adequate physical activity. Physical activity has also shown to reduce cravings. Remember, it is important that you know smoking can cause other risks to your body, such as heart attacks, strokes or even death. Quitting now will increase your life expectancy and is the best way to improve your cardiovascular health. What sort of things do you like doing to improve your health?

**C: I like walking in nature. I think I will incorporate more of this into my routine. I learned a lot from this interaction with you today. I am going to talk to my spouse about quitting and come back to the pharmacy to discuss further plans with you.**

P: That is great news. I am happy to help you, and I am looking forward to you coming back. It is fantastic that you want to talk to your spouse first. Informing your family and friends about quitting will allow you to gain support during this journey. I will give you these readings and resources that include the information we discussed today and additional details on the benefits of quitting tobacco use. If you agree I will call you during the week to follow up with any question. And please come back and visit us at the pharmacy if you have any questions or concerns. We are always here to help you.

**C: I will look at this material and come visit you this week. Thank you for your help.**

P: Happy to help. See you soon.

#### **Brief advise example 2: Helping quit tobacco use**

**C: Hi there. I would like to quit tobacco use and I hope that you can help me.**

P: Hello. Yes of course, I would love to help you stop tobacco use, it is the best action you can take to protect your health now and for the future. How often do you smoke cigarettes or use tobacco products?

**C: I have smoked at least four or five cigarettes every day for the past 10 years. I have tried to stop tobacco use in the past, but I am not sure why I cannot be successful.**

P: I understand it can be a hard habit to break, but it is not impossible. Every quit attempt is an opportunity to learn about the situations that can facilitate or difficult your quitting. Can you identify some of these situations?

**C: Yes, I associated tobacco use with my old job, which was very stressful. And also, because all my colleagues were tobacco users and it was difficult to be around them without smoking a cigarette. It would probably be easy to try now because I have recently changed to a less stressful job, and I work from home. So, I don't have to face these two situations.**

P: That sounds good. I'm glad you've been able to identify these two situations, and once they are no longer present in your life, you may be able to quit smoking on this new attempt. It is very important to be able to identify the challenges and difficulties in quitting smoking, and once they are removed, it becomes easier to quit. Well done.

**C: I think this time I do. I understand the effects it can have on my body, and I want to take care of it since I am getting older. How can I start?**

P: That is great to hear. I am here to help you in any way that I can during your journey. Let's create a quit plan to help you prepare. First, we will set a quit date. Until that time, you should tell family and friends about your quitting and ask them for their support. This experience will not be easy and will come with some challenges, but having help from others will guide you through this process. It is also important that you remove all tobacco products from your home and make sure your home and workspace remain a smoke-free environment. What sort of things have you tried in previous quit attempts? Have you any ideas yourself?

**C: The other times I tried to stop smoking without help. When I was alone, I could cut down on cigarettes, but when I went to work and everyone around me smoked, I ended up smoking too, so I never succeeded. And I also smoke more when I am bored and don't have anything to do at the house. I don't have ideas of what can I do when I felt bored.**

P: I can understand how that may be linked to your smoking. Would you like me to share some ideas on what other people have found useful?

**C: Yes, please.**

P: Some people consider taking up a new hobby that they enjoy. This will get you to spend your time doing activities you like and distract you from wanting to smoke from boredom. What sort of things do you like to do?

**C: I like gardening. I will try to spend more time in the garden now that I have spent more time at home. Thank you for the reminder. I think this will be an adjustment, but I am ready to stop smoking and take care of my body. Are there any places I can go for extra support?**

P: Yes. You can always come to us at the pharmacy for any questions and concerns you may have. I will also provide you with additional material that has information on quit lines and support groups. These resources offer great benefits in helping you quit smoking with more information inside on how to reach the free help line and programmes in your local community.

**C: Okay, this is great. Will you check-in on me during this process?**

P: Definitely. Let's schedule a follow-up visit in person this week so we can talk through your experience and address any questions or concerns you may have. Then, moving forward, we can follow-up in a month or whenever you feel necessary. What questions do you have for me?

**C: What if I am not successful in quitting smoking?**

P: That is okay. Remember that even if you are not successful this time around, you can learn from this experience and continue to work on stopping in the future. If needed, we can also look into specialist support or pharmaceutical products that can help you with quitting smoking. Making the first step to acknowledging the importance of smoking cessation is important and you are doing a great job already. Continue believing in yourself and know there is additional help there for you. Please contact me or a colleague at the pharmacy if you have any questions.

**C: Okay I will, thank you so much for your help.**

### 3.1.2 Brief tobacco interventions for those who are not yet ready to quit (5Rs model)

The 5Rs model (Figure 3) is a brief motivational intervention model developed based on the principles of motivational interviewing to help those who are not ready to change a behaviour. The model increases motivation to quit tobacco use and includes five essential elements of the motivational counselling intervention: relevance, risks, rewards, roadblocks, and repetition. Pharmacists can use this model to personalise the message and help patients recognise the relevance of quitting tobacco use to their health, identify the risks associated with tobacco use, highlight the rewards of quitting, anticipate roadblocks to success, and reinforce the message through repetition. By using the 5Rs model, pharmacists can effectively increase motivation to quit tobacco and help individuals achieve long-term success in tobacco cessation.<sup>13</sup> The 5Rs stand for:

**Relevance:** The “relevance” step involves identifying why the behaviour change is important and how it relates to the individual's goals and values. Motivational information is an effective strategy that can be implemented by pharmacists when addressing disease status, risks, health concerns, prior quitting experience, or personal barriers to cessation. A question like “How is quitting most personally relevant to you?” is an example of how professionals can encourage patients to share their thoughts on tobacco cessation.<sup>13</sup>

**Risks:** In the “risks” step, the pharmacist should assist patients in identifying and recognising the negative impacts of tobacco use that are relevant to them individually. Here the pharmacist can ask “What do you know about the health risks that can occur due to tobacco use?” and “What specifically worries you?” to evaluate their concerns. Risks can be either acute, long-term or environmental. Acute risks can be classified as shortness of breath, asthma exacerbation, increased risk of respiratory infections, harm to pregnancy and infertility. Long-term risks may include heart attacks,

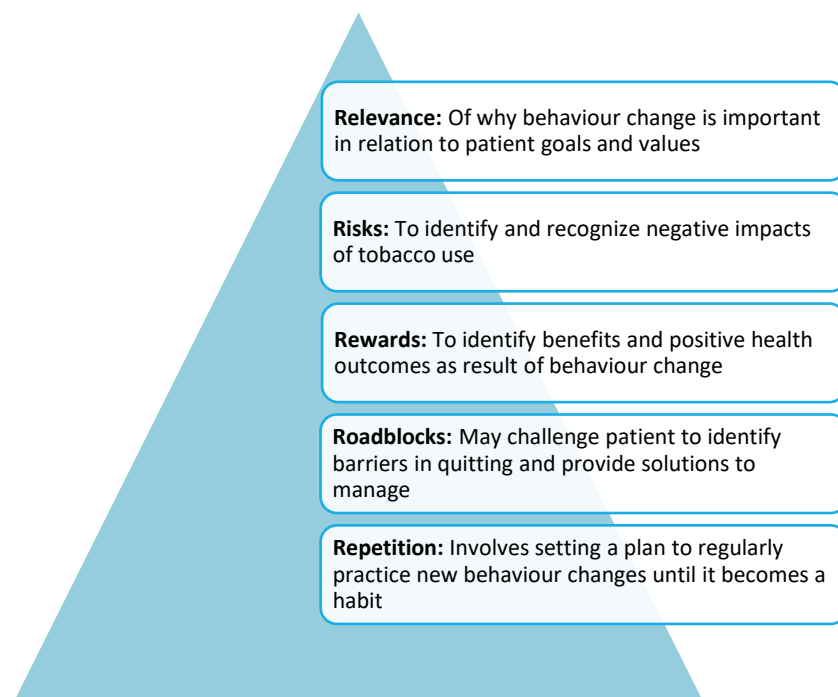
strokes, cancers, COPD and the need for continued care. Environmental risks such as increased risk of lung and heart disease in partners, low birthweight, sudden infant death syndrome, asthma and respiratory infections in children of tobacco users are examples of negative consequences of tobacco use.<sup>13</sup>

**Rewards:** The “rewards” step involves identifying the benefits and positive outcomes that the individual will experience with the behaviour change. The pharmacist should ask the patient to recognise the advantages of tobacco cessation by asking questions such as “Do you know what quitting tobacco can do for your health?”. Common examples of rewards may include improved health outcomes, financial savings, becoming a role model for children and family members, improved sense of smell and taste, and increased performance in physical activities. Tobacco cessation also benefits physical appearance by reducing wrinkles and the effects of ageing, and having whiter teeth, which may result in feeling better about oneself. A pharmacist should encourage tobacco users to quit by helping them understand the significance of cessation.<sup>13</sup>

**Roadblocks:** In the “roadblocks” step, the pharmacist may challenge the patient to identify particular barriers to quitting and provide solutions that could help manage these. Common barriers may include withdrawal symptoms, weight gain, depression, lack of support and fear of failure. Questions like “What would be hard about quitting tobacco use for you?” can help patients recognise their barriers and pharmacists can help guide patients by providing counselling and medication management.<sup>13</sup>

**Repetition:** The “repetition” step involves establishing a plan for regularly practising the new behaviour until it becomes a habit. The pharmacist should continue evaluating the patient’s readiness to quit tobacco use. Repetition is encouraged to be performed at every visit when an unmotivated patient approaches the pharmacy counter. The pharmacist may say “Now that we’ve talked about this, let’s see if you feel differently”. Here, the pharmacist should reflect on the 5As model where we assess the readiness of the patient to make a quit attempt. The pharmacist should ask the patient the two necessary questions to determine willingness and, if the patient is ready to quit, follow the 5As model and implement those strategies to assess quitting. If the patient is not ready, end the interaction with positive comments such as “I understand this is a difficult process, but I know you can do this, and we are here to help you”. Ending with encouraging words will encourage the patient to come back to you if they decide to change their behaviour.<sup>13</sup>

Figure 3. The 5Rs model to increase motivation to quit<sup>13</sup>



Overall, the 5Rs model is a practical and flexible approach to behaviour change that can be applied to a wide range of habits and behaviours, including health-related behaviours, lifestyle habits and personal development. By addressing the key factors that influence behaviour change, the 5Rs model can help individuals increase their motivation and confidence and, ultimately, achieve their goals. The pharmacist should apply this model and strategies in those patients who are not ready to quit.

## 3.2 Intensive behavioural support/counselling

Behaviour change focuses on how to effectively help individuals modify their behaviours to achieve specific goals or improve their well-being. It typically focuses on developing new habits and skills that support positive change, as well as increasing motivation and self-efficacy. This can include advice on how to make lasting changes, how to overcome obstacles and temptations, how to track progress and how to maintain positive behaviours over time. Behavioural interventions take the form of advice, discussion, encouragement and other activities designed to help quit attempts succeed.<sup>114</sup>

Intensive behavioural support or counselling is a comprehensive, multidisciplinary approach to behaviour change that focuses on helping individuals overcome complex or persistent behaviour problems. This type of support typically involves a combination of individual counselling or therapy, family or peer/group support, and community-based interventions with the usage of specific tools targeted to the needs of specific populations, such as the vulnerable communities. Pharmacists play a key role in providing support and counselling to patients through being readily available to various groups in the community by offering advice, encouragement, resources and treatment recommendations.<sup>84</sup>

Intensive behavioural support is often used to address complex or persistent behaviour problems, such as substance abuse, eating disorders and other mental health conditions. It may also be used to help individuals with developmental disabilities, autism or other neurodevelopmental conditions to improve their social and adaptive skills.<sup>84</sup>

The goal of intensive behavioural support is to help individuals achieve lasting, meaningful change in their behaviour by addressing the underlying factors that contribute to the problem. This may include addressing mental health concerns, improving social skills and relationships, and developing new coping strategies and habits.<sup>114</sup>

Intensive behavioural support typically involves working closely with the individual, their family, and other healthcare professionals to develop a comprehensive, individualised treatment plan that addresses their unique needs and goals. This type of support is often provided over an extended period, with regular follow-up and monitoring to ensure that progress is being made and that any barriers to change are being addressed.

Intensive behavioural support is a proven approach to help individuals quit tobacco use. It involves a combination of counselling, coaching and medication management to address both the physical and psychological aspects of addiction. Behavioural support can include strategies such as identifying triggers and coping mechanisms, setting achievable goals, and providing ongoing encouragement and support. Intensive behavioural support can be delivered through a variety of channels, including in-person or virtual counselling sessions, phone-based coaching or group counselling programmes. Research has shown that individuals who receive intensive behavioural support are more likely to successfully quit tobacco use and remain abstinent in the long term.<sup>114</sup> Some examples of intensive behavioural support include:

- **Group counselling:** Group counselling sessions are designed to provide support and guidance to individuals who are trying to quit tobacco use. Participants can share their experiences, ask questions, and receive feedback from others who are going through the same process.<sup>114</sup>
- **Individual counselling:** Individual counselling sessions provide personalised support and guidance to individuals who are trying to quit tobacco use. During these sessions, individuals can discuss their specific challenges and barriers to quitting, and work with a counsellor to develop a plan for overcoming them.<sup>114</sup>
- **Telephone counselling:** Telephone counselling is a convenient and accessible way to receive intensive behavioural support for tobacco cessation. Individuals can call a quitline to speak with a trained counsellor who can provide advice, support and information about quitting tobacco use.<sup>114</sup>

### 3.2.1 Motivational interviewing

Motivational interviewing is a type of counselling that focuses on helping individuals increase their motivation to change. During these sessions, individuals can explore their thoughts and feelings about quitting tobacco use and develop a plan for overcoming any obstacles to change. A fundamental counselling tool that encourages a patient's motivation to change is the use of close-ended and open-ended questions. The use of these questions should be enforced at every interaction with the patient, including their first-time visit and any follow-up meetings. Close-ended questions allow the pharmacist to collect significant information about the patient to further help them. These questions generally start with the words "what", "where", "how", "have", "when", and "does". Once the pharmacist understands the situation, they can transition to open-ended questions to understand concerns and feelings. Questions such as "How has therapy been going for you?" or "Tell me what you think about this entire process" are ways to get more than one-word answers from the patient and may allow them to self-recognise and reflect on their thoughts to promote positive change.<sup>127, 128</sup>

To have a successful motivational interviewing conversation, it is necessary to include the four different processes: engagement, focusing, evoking and planning. The engagement process is utilised by providers to understand the patient's situation and create an environment for them to be comfortable when discussing behaviour change. During the engagement process, the pharmacist should ensure they are supportive, comforting and building a relationship with the patient. The focusing process is often utilised to direct the conversations where the patient should establish goals such as target behaviour and barriers to the behaviour change. The evoking process allows the pharmacist to guide the patient in positive change and help build motivation. It also allows reflection on the patient's willingness to be better, and the pharmacist should aid the patient in developing internal motivation through the conversation. The planning process utilises the dedication needed to change and resolve conflicting ideas or concerns. The pharmacist should create a clear plan of action that includes setting goals, forming plans and building support for the patient.<sup>129</sup>

Additionally, there are four core motivational interviewing skills, known as OARS — open-ended questioning, affirming, reflecting and summarising. These skills are essential when used in counselling and assisting patients in tobacco cessation:

- **Open-ended questions** allow the patients the chance to share their perspectives on the given situation and any important information that may be useful. If open-ended questions are provided to the patient, they gain more trust and acceptance in terms of behaviour change. Open-ended questions require the patient to answer with more than a "yes" or "no", and often allows them to reflect on their thoughts to implement a positive change. It is also important to consider the usage of close-ended questions where appropriate as these can provide quick answers to simple questions.<sup>129</sup>
- **Affirmations** in motivational interviewing are key elements in building the confidence of positive behaviour change in the patient. The pharmacist should provide effective affirmations that are sincere and appropriate, so the patient feels recognised and understood.<sup>129</sup>
- **Reflecting** is a primary skill used in motivational interviewing to establish interest, empathy and understanding towards the patient. Reflective listening allows the pharmacist to engage in what the patient is saying, clarify any questions or concerns and manage conflict to influence positive behaviour change.<sup>129</sup>
- **Summarising** is a tactic that allows the pharmacist to sum up the conversation encountered in three or four sentences. During this time, the information discussed should be reinforced to the patient to demonstrate active listening and to ensure both individuals agree with the information addressed. Summarising also offers an opportunity to avoid misunderstandings, correct information and address concerns.<sup>129</sup>

### 3.2.2 Cognitive and behavioural strategies to support tobacco cessation

Pharmacists can play a crucial role in implementing cognitive and behavioural strategies to support tobacco users in their efforts to quit. Cognitive strategies involve using logical thought to help overcome addiction, challenging the perceived benefits of tobacco use and coping with cravings. Pharmacists can help by providing information on the risks of tobacco use and the benefits of quitting and encouraging tobacco users to consider the consequences of tobacco use. They can also challenge the perceived benefits of tobacco use, such as stress relief or weight control, and demonstrate how tobacco users can cope with their stress levels without cigarettes.<sup>130</sup>

Maintaining a tobacco use diary for a few days before the quit day can prove beneficial for some patients, as it helps them become more aware of their tobacco use patterns. By tracking their tobacco use triggers and high-risk situations, patients can develop alternative activities and coping strategies. For instance, if a patient discovers that their morning

cup of coffee triggers their tobacco use urge, they could consider switching to tea or juice instead to reduce the mental association. Tobacco users can have a complex relationship with their tobacco use habits built over several years. Thus, quitting this lifetime habit requires significant effort and time. Cognitive strategies can also help ex-tobacco users deal with their cravings. Pharmacists can guide patients in thought stopping, where they make a conscious effort not to think about tobacco use or thought substitution, where they choose to think about something else to distract their minds.<sup>130</sup>

Several behavioural strategies that can be recommended to help tobacco users cope with high-risk situations and triggers. Pharmacists can suggest some strategies and support tobacco users in finding their own alternatives and substitute activities. For example, the “4Ds” is a helpful strategy that suggests delay, deep breathing, drinking water slowly, and doing something else to take the mind off tobacco use. Delaying acting on the urge to smoke is recommended as the urge typically weakens after five minutes, and the motivation to quit will come back. Taking long, slow breaths and holding them in for a few seconds before slowly releasing them can help to calm the mind and reduce anxiety. Drinking water slowly and savouring the taste can provide a similar sensation to tobacco use and help relieve the urge to use tobacco. Finding a distracting activity, such as doing exercise, can help take the mind off tobacco use and reduce the desire to use tobacco. These strategies can be useful for tobacco users trying to quit, and pharmacists can suggest and support the implementation of these behavioural strategies to help their patients quit tobacco use.<sup>130</sup>

### Example of a follow-up visit

**C: Hello. Nice to see you again. I am back for my follow-up appointment with you.**

P: Hi there. It is so great to see you again. How have you been doing?

**C: I am doing well. There are days when not smoking is hard, but I am trying my best.**

P: You are doing a great job. Have you been successful in quitting smoking?

**C: Yes. And if I have moments when I want to smoke, I try to get up and do something productive instead.**

P: Congratulations. Finding strategies and hobbies to distract yourself and redirect those situations is a great way to prevent smoking. Tell me more about what you are doing. Tell me what kind of productive activities you are doing instead of smoking.

**C: Well, I like cycling. It makes me forget the urge to smoke and I even feel that I am improving my physical health.**

P: This is great! Tell me, what do you like about being abstinent?

**C: I never realised I wasted so much money on cigarettes. After I stopped smoking, I was able to save all the money I would have spent on cigarettes every day and I plan to buy something nice at the end of the year.**

P: That is a fantastic way to reward yourself. Quitting can be hard, but you are on a great path to success. I am glad to be here to help you on your journey. So, tell me how this process is going for you.

**C: Like you said, it can be hard sometimes. I know the best way to improve my overall health and lower the risk of further health concerns I need to continue to stop smoking. I am seeing improvement in my coughing and breathing, and I am also using my inhalers less. I like that I am saving money because I quit a bad habit. I know it will continue to be challenging but with the support from my family and pharmacy, I know I can do this.**

P: We are here to help you. I am so glad you understand the benefits of not smoking and seeing improvements in your symptoms. You are practising good behaviour changes and the progress you are making is already making a difference. Using your inhalers less shows your breathing is getting better and continuing quitting prevents any medication interactions. What questions do you have for me?

**C: I read the material you provided me at our last visit when we created a quit plan. You gave me information on services, support groups and basics of smoking cessation. As you know, I'm using a nicotine replacement therapy product. I have been using step 1, the 21mg patches and my doctor suggested moving to step 2 now.**

P: Yes, you will be transitioning from the 21mg step 1 patches to the 14mg step 2 patches. The doctor has reduced your dosage. How is the medication going for you?

**C: The patches have been working great. I don't notice any disruptions in my sleep and dreams, however I do notice my skin was red at the application site. Is that normal?**

P: That is great to hear you're doing well on the NRT. Skin irritation is completely normal when using patches. To prevent the irritation from worsening, make sure to switch the site of the patch daily and put it on hairless skin. Congratulations on your journey so far. You are taking great steps in protecting your health and engaging in a healthier lifestyle. Let's set another personal visit follow-up one month from today. Until then, please call the pharmacy when you need help. We are here to address any questions or concerns.

**C: That is perfect. I will see you again soon. I am proud of how far I have come, and I am looking forward to continuing my positive behaviours. Thank you.**

## 3.3 Pharmacological treatment of tobacco dependence

Pharmacological interventions play a significant role in the management of tobacco dependence, as they can help reduce withdrawal symptoms and cravings, thereby increasing the chances of quitting tobacco use. Medicines for tobacco cessation are classified into first-line (most effective and with few side effects): nicotine replacement therapy (NRT), bupropion SR (sustained release) and varenicline; and second-line (less effective and with more side effects): nortriptyline.<sup>115, 131</sup> First-line medicines are effective in helping tobacco users quit, and they are often used in combination with behavioural interventions to increase their efficacy.<sup>115</sup> Pharmacological treatment may be recommended for all patients, particularly those who smoke 10 or more cigarettes daily or those who start smoking within 30 to 60 minutes after waking up.<sup>117, 132</sup>

Roughly 70% of cigarette smokers want to quit smoking, however, it usually takes an average of around six attempts to achieve long-term cessation. Whereas each of them can be effective when used alone, combining behavioural counselling and pharmacotherapy using NRT products, bupropion, or varenicline can significantly increase the likelihood of quitting tobacco use. According to a meta-analysis of 19,488 tobacco users, the combination of medication and behavioural counselling yielded a 15.2% quit rate over a six-month period, in contrast to a 8.6% quit rate associated with brief advice or standard care.<sup>118</sup>

As medicines experts, pharmacists play a crucial role in supporting tobacco cessation efforts, by educating patients about the various medicines available, assessing nicotine dependence, recommending appropriate pharmacotherapy, monitoring medicines use, and providing counselling to support tobacco cessation. In addition, pharmacists can work collaboratively with other healthcare providers to ensure that patients receive comprehensive and coordinated care for tobacco dependence.

### 3.3.1 First line treatment

First-line pharmacological treatments for tobacco dependence include NRT and non-nicotine medicines like varenicline and bupropion.<sup>115</sup> A clinical trial called EAGLES conducted a randomised double-blind study involving 8,144 tobacco users to assess the efficacy and safety of varenicline, bupropion, nicotine patch and placebo. The results indicated that varenicline had a significantly higher six-month quit rate of 21.8% compared with bupropion (16.2%) and the nicotine patch (15.7%). Each treatment option was more effective than placebo (9.4%). Combining different NRT products, such as using a nicotine patch in conjunction with other NRT products, is more effective than using a single NRT product. Additionally, combining medicines with different mechanisms of action, such as varenicline and NRT, has been shown to enhance quit rates in some studies compared with using a single product. Therefore, NRT and non-nicotine medicines are effective first-line pharmacological treatments for tobacco dependence, but it is important to use these treatments in combination with behavioural support and counselling to achieve the best results.<sup>118</sup>

It is important to note that patients should receive appropriate guidance on which medicine to use, depending on their individual needs and medical history. Also note that, in some countries, there may be restrictions on pharmacists prescribing or dispensing varenicline and bupropion, and they may require a prescription from a physician. It is important for pharmacists to be aware of the regulations and laws regarding the prescription and dispensing of tobacco cessation medicines in their respective countries.



**Nicotine replacement therapy:** NRT is a therapy that delivers controlled amounts of nicotine to help manage withdrawal symptoms and cravings that arise when quitting tobacco use. NRT comes in various forms, such as gums, lozenges, patches, inhalers and nasal sprays, all of which release nicotine gradually, thereby reducing the intensity of symptoms and cravings. With several options available, patients can select the most suitable NRT product based on their specific requirements, tolerance and budget. NRT products have demonstrated effectiveness in providing an alternative to tobacco by offering nicotine-containing substitutes. Hence, choosing the right NRT product is critical for successful tobacco cessation, and requires consideration of patient preferences and individual circumstances.<sup>115</sup>

Combination NRT therapy, which involves using multiple forms of NRT, may be a suitable option for patients who have not had success with a single form of NRT, as it provides a more comprehensive and personalised approach to managing withdrawal symptoms and cravings.<sup>131</sup> Combination NRT involves the simultaneous use of a nicotine patch (a long-acting form of NRT) and a short-acting nicotine product such as nicotine gum or nicotine lozenge, chosen by the patient. The patch delivers continuous relief from withdrawal symptoms for 24 hours while the short-acting product is used as required to manage any unexpected cravings or withdrawal symptoms. Combination NRT is the recommended approach to NRT, but depending on factors such as cost, side effects and patient preference, using a single form of NRT may also be an acceptable option.<sup>115</sup> Table 3 includes examples of NRT products that could be used for tobacco cessation.<sup>115, 127, 131</sup>

Table 3. Nicotine replacement therapy products<sup>115, 127, 131</sup>

NRT products	Dosing	Initial dosing	Administration	Side effects	Pharmacy interventions/ special considerations
<b>Gum</b>	<ul style="list-style-type: none"> <li>• 2 mg</li> <li>• 4 mg</li> </ul>	<ul style="list-style-type: none"> <li>• For tobacco users who smoke within 30 minutes of awakening, recommend the 4mg dose.</li> <li>• For tobacco users who smoke more than 30 minutes after awakening, recommend the 2mg dose.</li> </ul>	<ul style="list-style-type: none"> <li>• Maximum: 24 pieces/day</li> <li>• 1 piece every 1–2 hours daily for 6 weeks.</li> <li>• 1 piece every 2–4 hours daily for 2 weeks.</li> <li>• 1 piece every 4–8 hours daily for 2 weeks.</li> </ul>	<ul style="list-style-type: none"> <li>• Headache</li> <li>• Cough</li> <li>• Mouth irritation</li> <li>• Hiccups</li> <li>• Jaw pain</li> <li>• Dyspepsia</li> </ul>	<ul style="list-style-type: none"> <li>• Each gum lasts ~ 30 minutes.</li> <li>• Gum should not be chewed constantly like regular gum.</li> <li>• Slow chewing allows for the gum to release a “peppery” tingle-like feeling implying the gum should be placed between the gum and cheek for nicotine absorbance.</li> <li>• Rotate where the gum is “parked” in the mouth.</li> <li>• When the tingle-like sensation is gone, slowly chew the gum to reactivate nicotine release.</li> <li>• Discard gum after 30 minutes or after sensation loss.</li> <li>• Treatment may last up to 12 weeks</li> </ul>
<b>Lozenges</b>	<ul style="list-style-type: none"> <li>• 2mg</li> <li>• 4mg</li> </ul>	<ul style="list-style-type: none"> <li>• For tobacco users who start smoking within first 30 min of waking, recommend the 4mg nicotine lozenge.</li> <li>• For tobacco users who smoke their first cigarette more than 30 min after waking, recommend the 2mg lozenge.</li> </ul>	<ul style="list-style-type: none"> <li>• Patients may use up to 1 lozenge every 1 to 2 hours for the first 6 weeks of treatment.</li> <li>• Maximum dose: 5 lozenges every 6 hours or 20 lozenges per day.</li> <li>• Gradually reduce number of lozenges used per day over the next 6 weeks.</li> </ul>	<ul style="list-style-type: none"> <li>• Nausea</li> <li>• Hiccups</li> <li>• Cough</li> <li>• Headache</li> <li>• Dyspepsia</li> </ul>	<ul style="list-style-type: none"> <li>• Alternative for patients who do not desire or are unable to chew nicotine gum (e.g., due to temporomandibular disease).</li> <li>• Absorption occurs when lozenge is rotated throughout oral cavity.</li> <li>• The lozenge should be place in the mouth and allowed to dissolve over 30 minutes.</li> <li>• Do not chew or swallow lozenge.</li> <li>• Treatment may last up to 12 weeks.</li> </ul>
<b>Patches</b>	<ul style="list-style-type: none"> <li>• 7mg</li> <li>• 14mg</li> <li>• 21mg</li> </ul> <p>3-step method: Step 1 = 21mg/24h</p>	<ul style="list-style-type: none"> <li>• The initial treatment dose depends on number of daily cigarettes:</li> <li>• Heavy smoker &gt;10 cigs/day</li> </ul>	<ul style="list-style-type: none"> <li>• &gt;10 cigs/day = 6 weeks of step 1, then step 2 for 2 weeks, and step 3 for 2 more weeks.</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Abnormal dreams</li> <li>• Insomnia</li> <li>• Skin irritation (transient itching, burning and tingling at the application site)</li> </ul>	<ul style="list-style-type: none"> <li>• Patch is produced in various dosages and follows the 3-step method, as explained in the dosing column.</li> <li>• Single patch should be applied to clean skin daily.</li> <li>• Patch applied to hairless skin between the neck and waist.</li> </ul>

NRT products	Dosing	Initial dosing	Administration	Side effects	Pharmacy interventions/ special considerations
	Step 2 = 14mg/24h  Step 3 = 7mg/24h	<ul style="list-style-type: none"> <li>Light smoker ≤10 cigs/day</li> </ul>	<ul style="list-style-type: none"> <li>≤10 cigs/day = 6 weeks of step 2, then 2 weeks of step 3.</li> <li></li> </ul>		<ul style="list-style-type: none"> <li>Patch site should be rotated daily.</li> <li>Do not cut patches into smaller pieces.</li> </ul>
<b>Nasal sprays</b>	0.5mg/ spray	<ul style="list-style-type: none"> <li>Administered every 1–2 hours in each nostril.</li> </ul>	<ul style="list-style-type: none"> <li>Recommended dose is 1 or 2 sprays per hour.</li> <li>The maximum dose is 10 sprays per hour, not to exceed 80 total sprays per day.</li> </ul>	<ul style="list-style-type: none"> <li>Nasal irritation</li> <li>Throat irritation</li> <li>Rhinitis</li> <li>Sneezing</li> <li>Tearing</li> </ul>	<ul style="list-style-type: none"> <li>Not recommended for patients with reactive airway diseases.</li> <li>Nasal sprays produce higher peak nicotine levels than other NRT products.</li> <li>To ensure adequate nicotine absorption, tell patient to tilt head backwards during instillation.</li> <li>Treatment may last for 3 to 6 months.</li> </ul>
<b>Inhalers</b>	4mg/ cartridge	<ul style="list-style-type: none"> <li>The initial dose is individualised “as needed” and tapered over the course of therapy:</li> <li>Patients may use 6 to 16 cartridges per day for the first 6 to 12 weeks of treatment</li> </ul>	<ul style="list-style-type: none"> <li>Dose taper down after first 3 months of use.</li> </ul>	<ul style="list-style-type: none"> <li>Mouth and throat irritation</li> <li>Rhinitis</li> <li>Coughing</li> </ul>	<ul style="list-style-type: none"> <li>Each cartridge provides 80 inhalations.</li> <li>Treatment may last up to 6 months.</li> </ul>

**Non-nicotine medicines:** There are several non-nicotine medicines that have been approved for the treatment of tobacco dependence (Table 4). Bupropion works as an antidepressant and helps to reduce withdrawal symptoms and cravings. Bupropion sustained release is thought to assist individuals in quitting tobacco use through two methods that do not involve nicotine. It works by hindering the reabsorption of norepinephrine and dopamine in the brain's nerve cells, which can decrease withdrawal symptoms, nicotine cravings and the urge to smoke. Additionally, it has a secondary effect of obstructing certain nicotinic acetylcholine receptors, although the full implications of this activity are not yet completely understood.<sup>127</sup>

Varenicline works by partially blocking the activity of nicotine receptors, which can reduce the pleasurable effects of nicotine and also alleviate withdrawal symptoms. This means that if patients using varenicline choose to smoke, they may find that the nicotine's effects are not as enjoyable. Numerous clinical studies have demonstrated that patients who receive varenicline are more successful at quitting tobacco use than those who are given a placebo.<sup>127</sup>

**Combination therapy:** Combination therapy involves the use of two or more medicines to increase the chances of success and improve cessation rates. For example, a combination of NRT and bupropion may be used to enhance the effectiveness of the treatment and reduce the severity of withdrawal symptoms and cravings. Due to its partial nicotine antagonist mechanism, varenicline should not be used in combination with NRT.<sup>127</sup>

Table 4. Non-nicotine medicines<sup>127, 130</sup>

Non-nicotine medicines	Initial dosing	Dose increase	Side effects	Contraindications	Pharmacist interventions/ special considerations
<b>Bupropion</b>	<ul style="list-style-type: none"> <li>• 150mg once daily for 3 days</li> </ul>	<ul style="list-style-type: none"> <li>• From day 4: 150mg twice daily</li> <li>• Max dose: 300mg</li> </ul>	<ul style="list-style-type: none"> <li>• Insomnia</li> <li>• Dry mouth</li> <li>• Headache</li> <li>• Weight loss</li> <li>• Nausea</li> <li>• Vomiting</li> <li>• Tachycardia</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Seizure disorder.</li> <li>• History of eating disorders (current or previous history of bulimia or anorexia nervosa).</li> <li>• Concurrent use of monoamine oxidase inhibitors or having taken them within the last 14 days.</li> <li>• Abrupt discontinuation of alcohol, benzodiazepines, barbiturates or antiepileptic medicines.</li> </ul>	<ul style="list-style-type: none"> <li>• Can use in combination with an NRT product.</li> <li>• Start medication 1–2 weeks prior to quit date and continue for 7–12 weeks.</li> <li>• Separate doses by 8 hours.</li> <li>• Patients who experience insomnia should consider an early administration time.</li> <li>• Generic formulation available for cost concern.</li> <li>• Some therapy durations may last up to 6 months in heavier tobacco users.</li> </ul>
<b>Varenicline</b>	<ul style="list-style-type: none"> <li>• Days 1 to 3 = 0.5mg once daily</li> <li>• Days 4 to 7 = 0.5mg twice daily</li> </ul>	<ul style="list-style-type: none"> <li>• Maintenance dosing titrated weekly.</li> <li>• Days 8 and later = 1mg twice daily</li> <li>• Continue this dose for 11 weeks (12 weeks of treatment total)</li> <li>•</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Nausea</li> <li>• Vivid dreams</li> <li>• Headache</li> <li>• Insomnia</li> <li>• Irritability</li> <li>• Suicidal thoughts</li> </ul>	<ul style="list-style-type: none"> <li>• Serious hypersensitivity</li> </ul>	<ul style="list-style-type: none"> <li>• Dosing titrations occur over 1 week period.</li> <li>• Medicine should be taken 1 week prior to quit date.</li> <li>• Treatment may last for 12 weeks; additional 12-week therapy may be needed in patients who successfully completed prior 3-month treatment to increase abstinence chances.</li> <li>• Should not be used with an NRT product due to its partial nicotine antagonist mechanistic effect.</li> </ul>

It is important to note again that pharmacological treatments for tobacco dependence should be used in conjunction with behavioural support and counselling, as these medicines are most effective when combined with a comprehensive quit plan.<sup>114</sup>

### 3.3.2 Second-line treatment

The second-line pharmacological treatment options for tobacco dependence are typically used when the first-line treatments have not been successful or are not well-tolerated by the individual. These options include alternative medicines, which target different mechanisms of action. Alternative medicines for the treatment of tobacco dependence include nortriptyline.

Nortriptyline is a tricyclic antidepressant that has been shown to have moderate efficacy in reducing the symptoms of withdrawal and reducing the urge to smoke (see Table 5).<sup>115</sup>

Table 5. Second line pharmacological treatment for tobacco cessation<sup>133, 134</sup>

Medicine	Starting dose	Dose increase	Side effects	Contraindications	Pharmacist interventions/Special considerations
<b>Nortriptyline</b>	<ul style="list-style-type: none"> <li>Days 1 to 3 = 25mg once daily at bedtime</li> <li>Days 4 to 7 = 50mg once daily at bedtime</li> </ul>	Maintenance dosing: <ul style="list-style-type: none"> <li>Day 8 and later = 75mg once daily at bedtime</li> </ul>	<ul style="list-style-type: none"> <li>Constipation</li> <li>Diarrhoea</li> <li>Dry mouth</li> <li>Nausea</li> <li>Urinary retention</li> <li>Nightmares</li> <li>Blurred vision</li> </ul>	<ul style="list-style-type: none"> <li>Hypersensitivity</li> <li>Use of MAOIs (concurrently or within 14 days of discontinuing either nortriptyline or MAOI)</li> </ul>	<ul style="list-style-type: none"> <li>Medication started &gt; 2 weeks before planned quit date.</li> <li>Pregnancy</li> <li>The length of treatment is 8–12 weeks.</li> </ul>

It is important to note that the use of nortriptyline for tobacco dependence treatment should be under the close supervision of a healthcare provider. This is because this medicine may have side effects and may not be appropriate for individuals with certain medical conditions. Additionally, individuals who are considering second-line treatments should be fully informed of their risks and benefits before making a decision.

### 3.3.3 Therapies with limited or unproven benefit

In addition to the first and second-line pharmacological treatments for tobacco dependence, there are other options that have been studied or used for this condition but have limited or unproven benefit. These include clonidine, cytisine and electronic cigarettes.

**Clonidine:** Clonidine is primarily used for the treatment of high blood pressure. However, it has also been studied for its potential in treating tobacco dependence, as it has been shown to have some effect in reducing symptoms of withdrawal, including irritability, anxiety and restlessness. Clonidine works by reducing the activity of the sympathetic nervous system, which is responsible for regulating the body's fight or flight response. In the context of tobacco dependence, clonidine may help to reduce symptoms of withdrawal by decreasing the activity of this system, thus reducing the severity of symptoms.<sup>118</sup> Clonidine is usually prescribed in low doses, either as a tablet or a transdermal patch, and is usually administered twice a day. Clonidine may have side effects, such as drowsiness, dry mouth and dizziness. Additionally, it may interact with other medicines and may not be appropriate for individuals with certain medical conditions, such as heart disease or liver disease.<sup>115, 118</sup>

**Cytisine:** Cytisine is a plant-based alkaloid and is a partial agonist that targets the alpha-4 beta-2 nicotinic acetylcholine receptor. Cytisine has been used for tobacco cessation in some eastern and central European and central Asian countries for many years but is not yet available in the United States or western Europe.<sup>115, 135</sup>

**Electronic cigarettes:** Electronic cigarettes are hand-held electronic vaping devices that simulate tobacco smoking by producing an aerosol that heats a liquid containing nicotine (see section 1.2). The aerosol that is produced from this device is breathed into the lungs and can contain harmful substances such as cancer-causing chemicals and particles.<sup>34</sup>

<sup>115</sup> Electronic cigarettes contain toxins that are addictive and detrimental for the body. These products are still newly introduced, and many additional studies need to be conducted to show their long-term health effects.<sup>136</sup> It is important to understand that the role of electronic cigarettes is unclear, and the long-term benefits have not yet been shown.<sup>115</sup> E-cigarettes pose health risks, especially for non-tobacco users, young adults and children, and while they may help tobacco users quit, better evidence is needed to understand their health impact, safety and efficacy for tobacco cessation.<sup>35</sup> Various health organisations, including the WHO, have raised concerns about the possible adverse health consequences of e-cigarette usage.<sup>37</sup>

Pharmacy professionals can play a crucial role in mitigating vaping by informing and guiding patients about e-cigarettes' potential harms and benefits. As trusted healthcare providers, pharmacists can help educate patients about the potential health impact of e-cigarettes and their use for smoking cessation. In countries such as Australia, pharmacists already dispense and advise on these products to adults who wish to quit smoking and have a prescription.<sup>137</sup>

### 3.3.4 Improving medication acceptance and adherence

Tobacco use is a difficult habit to break, with many people needing up to six attempts to quit successfully.<sup>118</sup> Through pharmacist provision of support and advice on medication adherence and management, health outcomes can be improved. In order to provide effective pharmacotherapy management, there are some considerations that need to be recognised and discussed with the patient. It is essential that the patient understands the importance of their willingness to make positive behavioural changes. Tobacco cessation medicines help to alleviate withdrawal symptoms; however, the medicine does not cure the addiction. The pharmacist should provide information about the potential effects of tobacco cessation and treatment management. In addition, it is important to ensure that the patient is taking the right dosage form and dose. This will reduce the risk of adverse effects. If the dose is too low, the drug will not be as effective, leading to withdrawal symptoms, whereas if the dose is too high, the patient may experience more side effects. It is also important that the patient knows for how long they need to take the medicine. Some NRT products have a step-down dosage after the medicine has been taken for an appropriate period. During this time, the patient should be encouraged to continue with the behaviour change. In addition, the patient may consider psychological support to further optimise treatment, because professional help increases the rate of success.<sup>119</sup>

Pharmacists can make use of the COM-B (capability, Opportunity, motivation, behaviour) model to design their tobacco cessation services. This model serves as a guide for the development and implementation of behavioural change interventions. Specifically, by utilising COM-B, pharmacists can create targeted interventions aimed at promoting tobacco cessation. "Capability" refers to a person's knowledge and skills necessary to engage in the activity of quitting tobacco use. "Opportunity" denotes external factors beyond the individual that can facilitate behavioural change. "Motivation" relates to the desire to change behaviour and encompasses emotions, habits and analytical decision-making. Together, capability, opportunity, and motivation interact to influence and drive behavioural changes. The COM-B model can also help to identify factors that serve as facilitators or barriers to adherence to nicotine replacement therapy. A 2020 systematic review analysed 26 studies that utilised the COM-B model to identify factors affecting adherence to NRT. The insights gained from this review can help guide the development of pharmacist-led interventions aimed at improving adherence to NRT.<sup>138</sup>

There are several medicines that have been shown to interact with tobacco smoke through pharmacokinetic or pharmacodynamic mechanisms. Pharmacokinetic interactions can impact how other medicines are absorbed, distributed, metabolised and eliminated, potentially leading to an other-than-expected pharmacological response. Pharmacodynamic interactions can modify the anticipated effects or actions of other medicines. The precise amount of tobacco smoking required to trigger an interaction is unknown, and it is assumed that all tobacco users are equally susceptible to the same degree of interaction.<sup>139</sup> In many of these cases where an interaction occurs, the patient may require a dose adjustment to achieve adequate medicine efficacy and safety. Medicines that have been shown to interact with tobacco smoke include clozapine, theophylline, olanzapine, propranolol, insulin, heparin, benzodiazepines such as alprazolam, opioids and tricyclic antidepressants, beta-blockers, haloperidol, inhaled corticosteroids and hormonal contraceptives.<sup>139, 140</sup> The combination of hormonal contraceptives is the most important interaction to consider, as women aged 35 years or older who smoke 15 or more cigarettes a day have an increased risk of serious cardiovascular side effects, making the use of all hormonal contraceptives contraindicated.<sup>139</sup> It is important for pharmacists to be aware of these medicine interactions so that they can provide effective advice to patients and liaise with other service providers as appropriate. More information on how to optimise treatment outcomes is available [here](#).

## 4 Additional resources and tools to support tobacco cessation

### 4.1 Digital tools for tobacco cessation

Digital tools for tobacco cessation have become increasingly popular in recent years. These tools can be very effective in helping individuals quit tobacco use and overcome tobacco dependence. Some of the most used digital tools for tobacco cessation are quitting apps, online support groups, NRT apps, text messaging programmes, virtual counselling and social media campaigns.

**Quitting apps:** Quitting apps are mobile applications that provide tobacco users with resources and support to quit tobacco use. They offer a range of features such as tracking progress, setting goals and providing motivational messages. Pharmacists can recommend the use of mobile apps and digital tools that provide personalised support and resources for quitting, such as the [WHO Quit Tobacco App](#).

**Online support groups:** Online support groups are virtual communities where people can connect with others going through the same process of quitting tobacco use. These groups offer peer support, advice and encouragement to help tobacco users stay on track. Examples of online support groups include [BecomeAnEX](#) and [QuitNet](#).

**NRT apps:** NRT apps provide support and resources for those using nicotine replacement products such as nicotine gum or patches. They offer features as dosage tracking, reminders and information about the benefits of NRT.

**Text messaging programmes:** Text messaging programmes are a simple and effective way to receive regular support and encouragement to quit tobacco use. They send daily or weekly text messages with tips, reminders and motivational messages to help tobacco users stay on track. An example of a text messaging programme is [SmokefreeTXT](#).

**Virtual counselling:** Virtual counselling provides online support from trained counsellors or coaches who can help tobacco users quit tobacco. They offer personalised support, advice and guidance to help tobacco users overcome obstacles and stay motivated. Examples of virtual counselling programme are [MyQuit Coach](#) and [Florence](#). Developed by the WHO in partnership with Soul Machines, Amazon Web Services and Google Cloud, Florence is an artificial intelligence bot that acts as a 24/7 virtual health worker, providing digital advice to people trying to quit tobacco use.

**Social media campaigns:** Social media campaigns can be an effective way to promote tobacco cessation and provide support to individuals trying to quit tobacco use. These campaigns can provide motivational messages, share success stories via video narratives and offer resources and support.

Overall, digital tools for tobacco cessation can be an effective way to quit tobacco use. They help people who are trying to quit to stay motivated and on track, making the process of quitting more manageable and less stressful. Table 6 and Table 7 list some of the digital and online tools, mobile applications and web-based programmes available for tobacco cessation.

Table 6. Digital and online tools available to support individuals to stop tobacco use

Organisation	Resource	URL
American Cancer Society (ACS)	ACS Guide to Quitting Smoking	<a href="https://www.cancer.org/healthy/stay-away-from-tobacco/guide-quit-smoking.html">https://www.cancer.org/healthy/stay-away-from-tobacco/guide-quit-smoking.html</a>
American Heart Association (AHA)	AHA Tobacco Cessation Resources	<a href="https://www.heart.org/en/healthy-living/healthy-lifestyle/quit-smoking-tobacco">https://www.heart.org/en/healthy-living/healthy-lifestyle/quit-smoking-tobacco</a>
American Lung Association (ALA)	ALA Freedom from Smoking	<a href="https://www.lung.org/quit-smoking">https://www.lung.org/quit-smoking</a>
Campaign for Tobacco-Free Kids	Tobacco-Free Kids Resources	<a href="https://www.tobaccofreekids.org/">https://www.tobaccofreekids.org/</a>
Centers for Disease Control and Prevention (CDC)	CDC Tobacco Cessation Resources	<a href="https://www.cdc.gov/tobacco/quit_smoking/index.htm">https://www.cdc.gov/tobacco/quit_smoking/index.htm</a>



Organisation	Resource	URL
European Network for Smoking and Tobacco Prevention (ENSP)	ENSP Resources	<a href="https://ensp.network/resources/">https://ensp.network/resources/</a>
National Cancer Institute (NCI)	NCI SmokeFree	<a href="https://smokefree.gov/">https://smokefree.gov/</a>
National Institutes of Health (NIH)	NIH Smoke-Free	<a href="https://smokefree.nih.gov/">https://smokefree.nih.gov/</a>
Truth Initiative	BecomeAnEX	<a href="https://www.becomeanex.org/">https://www.becomeanex.org/</a>
US Department of Veterans Affairs (VA)	VA Tobacco and Health	<a href="https://www.mentalhealth.va.gov/quit-tobacco/">https://www.mentalhealth.va.gov/quit-tobacco/</a>
World Health Organization (WHO)	WHO Tobacco Cessation Resources	<a href="https://www.who.int/activities/quitting-tobacco">https://www.who.int/activities/quitting-tobacco</a>
	WHO Quitting Toolkit	<a href="https://www.who.int/campaigns/world-no-tobacco-day/2021/quitting-toolkit">https://www.who.int/campaigns/world-no-tobacco-day/2021/quitting-toolkit</a>

Table 7. Mobile apps available to support individuals to stop tobacco use

Mobile app	iOS/Android/web-based	Subscription-based
<a href="#">ALA Freedom from Smoking Online Program</a>	Web-based (mobile-friendly)	No
<a href="#">BecomeAnEX</a>	Web-based (mobile-friendly)	No
<a href="#">NHS Quit Smoking</a>	Android/ iOS/ <a href="#">Web-based</a>	No
<a href="#">Butt Out - Quit Smoking Forever</a>	iOS	Freemium (free with in-app purchases)
<a href="#">Clickotine</a>	iOS/Android	Yes
<a href="#">Craving to Quit</a>	iOS/Android	Yes (free trial available)
<a href="#">Flamy</a>	Android	Freemium (free with in-app purchases)
<a href="#">Florence (WHO)</a>	Web-based (mobile-friendly)	No
<a href="#">ISMOKAY - QUIT SMOKING</a>	iOS/Android	Freemium (free with in-app purchases)
<a href="#">Kwit</a>	iOS/Android	Freemium (free with in-app purchases)
<a href="#">MyQuitBuddy</a>	iOS/Android	No
<a href="#">MyQuit Coach</a> (by LIVESTRONG)	iOS	No
<a href="#">NHS Quit Smoking</a>	iOS/Android	No
<a href="#">Quit Smoking NOW: Max Kirsten</a>	iOS/Android	Freemium (free with in-app purchases)
<a href="#">QuitGuide</a>	iOS/Android	No
<a href="#">QuitNow</a>	iOS/Android	Freemium (free with in-app purchases)
<a href="#">quitSTART</a>	iOS/Android	No
<a href="#">Quit Tracker: Stop Smoking</a>	Android	Freemium (free with in-app purchases)
<a href="#">Smoke Free</a>	iOS/Android	Freemium (free with in-app purchases)
<a href="#">SmokeFree28</a>	iOS/Android	No
<a href="#">Smokeless: Reduce or Quit</a>	iOS/Android	No
<a href="#">Stop Smoking - EasyQuit free</a>	Android	No
<a href="#">WHO Quit Tobacco App</a>	iOS/Android	No

## 4.2 Telephone support

Telephone support provides a convenient way for individuals to attempt to quit tobacco use. This support, also known as a quitline, offers counselling services remotely that include advice, guidance and motivation from competent healthcare providers to overcome tobacco cessation challenges.<sup>141</sup> The telephone support has benefited individuals with communication barriers, lack of access to other resources, mobility issues or living in remote areas. Furthermore, telemedicine with enhanced video-conferencing service offers equivalent effectiveness to telephone support. Nevertheless, the cost involved, the readiness of tobacco cessation centres and broadband access issues limit the use of telemedicine, especially in rural communities.<sup>142, 143</sup>

## 4.3 Self-help materials

Self-help materials are effective in helping individuals who require assistance in tobacco cessation interventions unaided by healthcare professionals or counsellors.<sup>144</sup> The information obtained from these materials includes health risks associated with tobacco use, tips on quit attempts, strategies for managing cravings or monitoring withdrawal symptoms. Nevertheless, tailored information to individual tobacco users is highly recommended,<sup>145</sup> and the availability of intensive programmes depends on a country's financial support.<sup>146</sup> The materials, provided as a stand-alone or adjunct therapy, allow individuals to self-manage their quit attempt at their own terms and pace. Self-help materials include books, leaflets, multimedia and online resources. Most materials are also available from interventions involving support groups via personal approach or telephone-based services and various community activities on tobacco cessation.

## 4.4 Tools for tobacco dependence assessment

There are three dimensions of tobacco dependence: physical dependence, psychological dependence, and behavioural and social dependence. It is therefore important to consider all three aspects when assessing a patient. There are several simple and easy-to-use tools that are commonly used for tobacco dependence assessment by healthcare professionals, including pharmacists. These tools are all designed to assess different aspects of tobacco dependence and can provide valuable information to help guide treatment decisions. Pharmacists can easily use these tools to assess a patient's level of nicotine dependence and the motivation to quit tobacco use, and, according to the results, provide the appropriate support to help individuals overcome tobacco dependence.<sup>147</sup>

### 4.4.1 Fagerström Test for Nicotine Dependence

The Fagerström Tolerance Questionnaire, initially developed by Karl-Olov Fagerström, underwent modifications in 1991 by Todd Heatherton *et al.* to become the widely used [Fagerström Test for Nicotine Dependence \(FTND\)](#).<sup>148</sup> The FTND has been commonly used in research studies and clinical settings to assess nicotine dependence and to monitor changes in dependence over time. It can also be used to identify individuals who may benefit from NRT or other tobacco cessation interventions.

The FTND is a self-administered, six-question questionnaire that assesses the intensity of physical addiction to nicotine. The test asks questions about tobacco use behaviour, such as how soon after waking up a person smokes and how many cigarettes they smoke per day, the compulsion to use and dependence. The questions are scored based on the individual's responses, and their results can be used to determine the level of nicotine dependence and guide pharmacists on the best course of treatment for their patients (see Appendix 1).<sup>148</sup> A variant of the FTND is used to measure dependence among smokeless tobacco (ST) users.<sup>149</sup>

### 4.4.2 Tobacco Dependence Screener

The Tobacco Dependence Screener (TDS) is a tool used to identify individuals who are dependent on tobacco. It is designed to be a quick and easy way to assess the level of tobacco dependence and provide the appropriate tobacco cessation interventions, such as NRT and counselling.<sup>150</sup>

The screener consists of a series of 10 questions that assess an individual's level of nicotine dependence, tobacco use behaviour, and history of attempts to quit tobacco use. Examples of questions include "How many cigarettes do you smoke per day?", "Have you ever tried to quit smoking before?", and "Have you ever used nicotine replacement therapy or other medicines to quit smoking?" (see Appendix 2). Based on the individual's answers to these questions, the screener provides a score that indicates the level of tobacco dependence. This score can then be used by pharmacists to determine the appropriate level of intervention or treatment.<sup>150</sup>

The TDS is based on the definitions of dependence outlined in both the Diagnostic and Statistical Manual, fourth edition (DSM-IV) and the International Classification of Diseases, 10th revision (ICD-10). The TDS is commonly utilised as a screening tool for tobacco dependence in studies related to cigarette smoking, but also demonstrated acceptable reliability and validity among ST users.<sup>151</sup>

### 4.4.3 The Cigarette Dependence Scale

The [Cigarette Dependence Scale \(CDS\)](#) is a tool that is used to assess the severity of cigarette dependence among tobacco users. This tool consists of 12-item scale labelled CDS-12, and a five-item version of this scale (CDS-5). CDS-12 covers the main components of DSM-IV and ICD-10 definitions of dependence (i.e., compulsion, withdrawal symptoms, loss of control, time allocation, neglect of other activities and persistence despite harm). CDS-5 has similar measurement properties but includes just the five first questions (see Appendix 3).<sup>152</sup> The CDS is particularly useful for identifying tobacco users who are highly dependent and may require more intensive interventions to quit smoking, such as NRT or second-line medication.

### 4.4.4 Nicotine Dependence Syndrome Scale

The [Nicotine Dependence Syndrome Scale \(NDSS\)](#) is a 19-item multidimensional scale that evaluates five aspects of addiction to nicotine: “drive” measures the cravings, withdrawal symptoms, and the compulsion to smoke; “priority” measures the level of preference for smoking compared with other forms of reinforcement; “tolerance” measures the decreased sensitivity to the effects of smoking; “continuity” measures the regularity of smoking habits; and “stereotypy” measures the consistency of smoking patterns.<sup>153, 154</sup>

### 4.4.5 Hooked on Nicotine Checklist

The [Hooked on Nicotine Checklist \(HONC\)](#) is a 10-item questionnaire that is utilised to establish the onset and degree of tobacco dependence in adolescents.<sup>155</sup> Each individual item on the checklist can be the first symptom to appear during the onset of autonomy loss, therefore inclusion of all 10 items from the questionnaire are important to measure the detection of loss.<sup>156</sup>

A positive response to any question from HONC demonstrates the loss of autonomy and the start of dependence, where the number of positive responses indicates the level of dependency. Currently, the HONC questionnaire has only been used in adolescents, however further testing is suggested to establish applicability for adult tobacco users.<sup>155</sup>

### 4.4.6 Heaviness of Smoking Index

The [Heaviness of Smoking Index \(HSI\)](#) is a two-item questionnaire, derived from the Fagerström Test for Nicotine Dependence, that measures the intensity and frequency of tobacco use.<sup>157</sup> The questions from this self-report test focuses on an individual’s time to first cigarette and number of cigarettes smoked per day to estimate the heaviness of smoking and dependence of tobacco. Nicotine dependence is then classified into three category levels: low (0–1), medium (2–4), and high (5–6) (see Appendix 4).<sup>158</sup>

### 4.4.7 Wisconsin Inventory of Smoking Dependence Motives (WISDM)

The [Wisconsin Inventory of Smoking Dependence Motives](#) is a 68-item questionnaire that was designed to assess 13 various smoking motives. The different domains included in this test are affiliative attachment, automaticity, loss of control, behavioural choice, cognitive enhancement, craving, cue exposure, negative reinforcement, positive reinforcement, social/environmental goals, taste/sensory properties, tolerance and weight control.<sup>159, 160</sup>

## 4.5 Tools to assess motivation or readiness for tobacco cessation

### 4.5.1 The Why test

The [Why test](#) was developed with a contribution from the Canadian Pharmacists Association and now it is widely used and promoted, for example, by the Centre for Addiction and Mental Health. This test allows patients to answer a set of short questions from various categories of reasons for smoking. Each answer will be indicated with a score that determines the individual’s motivation for tobacco use. This test provides an advantage for the pharmacist in helping patients identify and understand their reasons and triggers for smoking.<sup>161</sup>

### 4.5.2 Stages of Change assessment tool

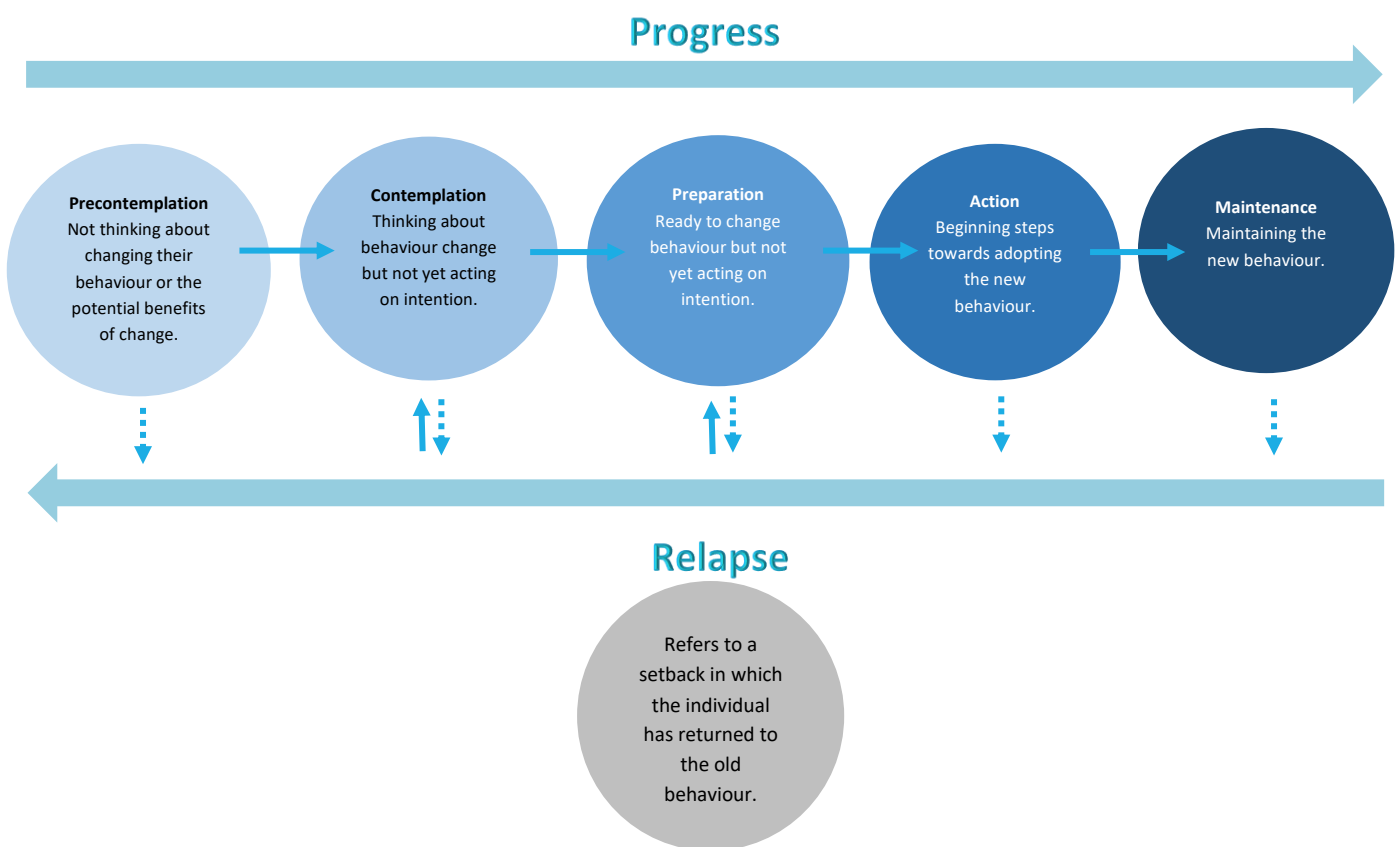
In 1983, Prochaska and DiClemente developed the Stages of Change as one component of the Transtheoretical Model of Behaviour Change, also known as TTM.<sup>162</sup> The TTM outlines the process, stages and methods of measuring change. The Stages of Change model includes five stages: pre-contemplation, contemplation, preparation, action and

maintenance. A sixth stage, relapse, is often added because setbacks are normal during the change process. Initially, the Stages of Change model was designed to help individuals overcome addictive behaviours such as tobacco use, drug or alcohol abuse, and overeating. However, it has since become the standard for change therapy and can be applied to a range of behaviours.

To categorise patients who smoke, one approach is to determine their “stages of change”, which involves assessing the patient’s readiness to quit. An easy way to determine this is by identifying if and when the patient is willing to consider quitting.<sup>163</sup> This tool allows pharmacists to determine a tobacco user’s level of readiness to change by identifying the five behavioural stages that the patient may encounter with addiction. The stages in this model (see

Figure 4) include: pre-contemplation, contemplation, preparation, action and maintenance. Below are scenarios that may occur and potential intervention that may be implemented with proper conversation.<sup>161, 163</sup>

Figure 4. Modified Stages of Change (adapted from Prochaska & DiClemente)<sup>162</sup>



#### Pre-contemplation

- Scenario: The patient approaches the pharmacy counter not willing to stop tobacco use and is defensive when asked about tobacco cessation. The patient says “never” or “in more than six months”.
- Intervention: The pharmacist should ask for permission to open conversation about cessation and offer advice on the benefits of stopping and any additional assistance necessary.
- Dialogue: “When, if ever, you are ready to discuss your tobacco use habits, I would be happy to help.”

#### Contemplation

- Scenario: The patient wants to stop tobacco use but has not considered taking the next steps. The patient says “in more than one month, and less than six months”.

- Intervention: The pharmacist can assist the patient in identifying triggers and understanding potential barriers to quitting by utilising motivational interviewing strategies.
- Dialogue: “What do you think may be preventing you from considering quitting tobacco use?” and “What are some reasons for you to quit tobacco use?”

### Preparation

- Scenario: The patient is ready to attempt quitting in the next month and has made a decision to commit to action.
- Intervention: The pharmacist should help the patient develop a quit plan, provide additional education on degree of nicotine dependence and assist in creating a strategy for quitting.
- Dialogue: “It’s great that you are ready to quit tobacco use, congratulations on making this decision. I am here to help you make a plan for you to succeed in your attempt.”

### Action

- Scenario: The patient is cutting down or has set a quit date.
- Intervention: The pharmacist should provide the patient with continuing support and resources to identify possible triggers to prevent relapse.
- Dialogue: “What do you think is your biggest challenge since you quit tobacco use?” and “Have you been experiencing any side effects due to medication or withdrawal symptoms?”

### Maintenance

- Scenario: The patient has remained smoke free for at least six months.
- Intervention: The pharmacist should provide support and encouragement throughout the patient’s journey. Monitoring for improvements in health outcomes should also be implemented.
- Dialogue: “What positive changes have you noticed since you stopped tobacco use?” and “What approaches have helped you to stop using tobacco?”

## 4.5.3 Motivation rulers

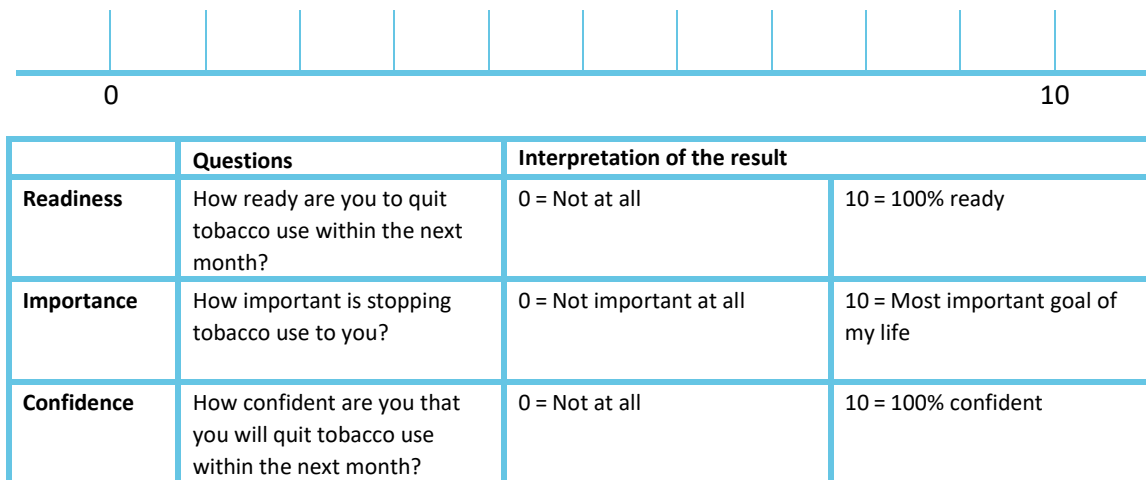
The Readiness to Change Ruler (RCR) is one example of a tool that could be used in tobacco cessation counselling to assess a patient’s readiness to quit tobacco use and easily elicits a conversation regarding motivations and barriers to quitting tobacco use.<sup>164</sup> The RCR is a useful tool because it acknowledges that patients are often in different stages of readiness to quit tobacco use and that interventions should be tailored to their level of readiness.

A ruler usually consists of a scale from 0 to 10, with 0 being “not at all ready to quit tobacco use” and 10 being “completely ready to quit tobacco use”. The patient is asked to rate their readiness to quit tobacco use on the ruler, and the score helps the pharmacist determine the patient’s stage of change and tailor their counselling accordingly. Next, the pharmacist asks the patient why they did not place the mark farther to the right. This information can help to identify potential barriers the patient is experiencing and allows the pharmacist to make suggestions for strategies to overcome these barriers. Finally, the pharmacist should ask the patient why they did not place the mark farther to the left. This provides information for motivational statements that can be delivered to the patient.<sup>164, 165</sup>

Depending on the questions, the motivation rulers could measure not only the readiness to quit tobacco use but also the importance of stopping tobacco use to the patient and their confidence to quit tobacco use (see

Figure 5). By using motivation rulers to assess patients’ motivation to quit tobacco use, pharmacists can provide more personalised advice and increase patients’ chances of successfully quitting. Motivation rules are useful tools to support motivational interviewing.<sup>164, 165</sup>

Figure 5. Motivation ruler — visual analogue scale



## 4.6 Tools to help verify tobacco use abstinence

### 4.6.1 Tools to assess the concentration of nicotine or metabolites

Nicotine is metabolised in the body to cotinine, trans-3'-hydroxycotinine and nornicotine.<sup>43</sup> Among these metabolites, cotinine is the most used marker for detecting nicotine exposure. The relationship between the amount smoked and the cotinine level is affected by alteration in the volume of nicotine in cigarettes, the use of cigarette products and smoking patterns.<sup>166</sup> Due to cotinine's longer plasma half-life, measuring cotinine levels is preferred over measuring nicotine levels.<sup>167</sup> Urine testing in laboratories can help distinguish between active and passive nicotine exposure based on the concentrations of nicotine and its metabolites detected. However, it should be noted that these results are not always conclusive. For identifying recent exposure, testing of plasma or serum may be necessary and useful.<sup>168</sup>

### 4.6.2 Assessment of carbon monoxide concentration in exhaled breath

Assessment of carbon monoxide (CO) concentration in exhaled breath is a non-invasive, quick, relatively inexpensive, reliable and common method for evaluating smoking status and exposure to tobacco smoke. CO is a toxic gas that is produced by incomplete combustion of organic materials, including tobacco. When inhaled, CO binds to haemoglobin in red blood cells, reducing the amount of oxygen that can be carried to tissues. The measurement of CO concentration in exhaled breath reflects the amount of CO that has been inhaled and absorbed into the bloodstream.<sup>169</sup>

The assessment of CO concentration in exhaled breath is typically performed using a CO breath analyser, also known as a CO monitor. The individual being tested breathes into a mouthpiece attached to the analyser, which measures the amount of CO in the exhaled breath, typically as parts per million.<sup>170</sup>

In tobacco users, CO concentration in exhaled breath is significantly higher than in non-tobacco users. A typical non-smoker has a CO concentration of less than 10 ppm, whereas a smoker may have concentrations ranging from 10 ppm to over 30 ppm, depending on the number of cigarettes smoked and other factors. Additionally, exposure to second-hand smoke can also result in increased CO concentrations in exhaled breath.<sup>171</sup>

The assessment of CO concentration in exhaled breath can be useful in several contexts, including tobacco cessation programmes, research studies on smoking behaviour and exposure, and occupational health and safety assessments.<sup>169</sup>

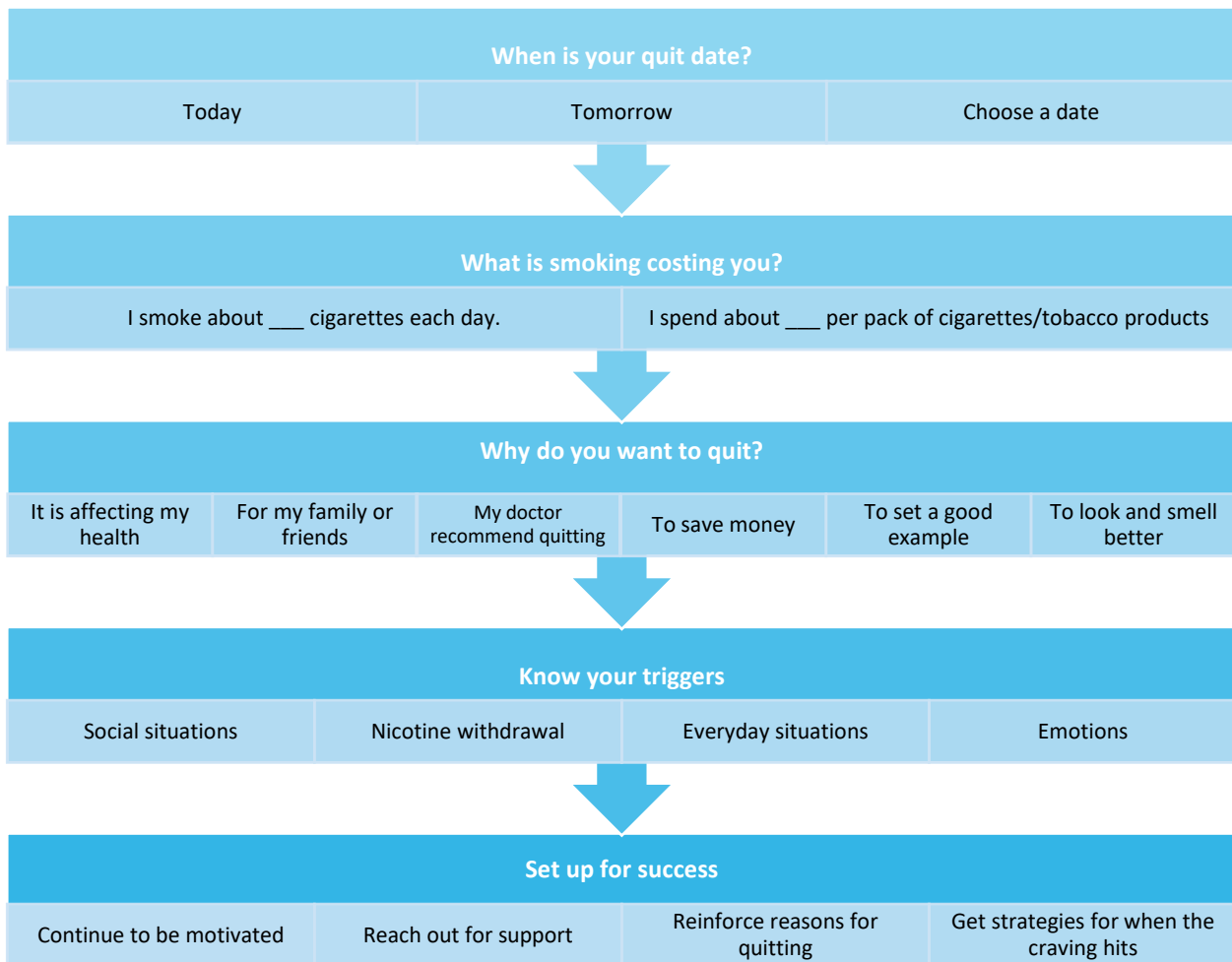
## 4.7 Tools to support quit attempts and promote long-term cessation

Pharmacists can provide routine follow-up interventions and assessments to support patients on their tobacco cessation journey. They have the opportunity to interact more frequently with patients and therefore play an important role in public health access to tobacco cessation services. Follow-up is one of the most relevant steps in successful quitting and maintaining a tobacco-free lifestyle. Figure 6 provides an example of a quit plan that allows patients to see and understand the steps that can be taken to effectively quit and maintain a tobacco-free lifestyle.

Pharmacists can intervene at any stage of the process, providing support and resources to ensure a patient's success. Follow-up protocols are critical to success. Therefore, pharmacists should always be vigilant in encouraging patients with a history of tobacco use to follow up with the pharmacy or healthcare provider to ensure that they are offered all possible cessation options and support.<sup>161</sup>

Quitting tobacco use can be challenging. However, developing a personalised quit plan can simplify the process, help patients stay focused and determined during difficult times, and ultimately lead to successful quitting for good. It is important to identify exactly what the patient is trying to quit so the pharmacist can work with them to create the most accurate plan. Different products such as vapes, cigarettes and smokeless products contain different amounts of nicotine and the duration of use of these products can affect the severity of withdrawal symptoms. It is also important to identify the exact date the patient wants to quit, the motivations for quitting and the triggers that may cause cravings. In the first few days of quitting, it is important to identify any difficulties or withdrawal symptoms the patient may be experiencing to have strategies for when cravings occurs, and to follow up with the healthcare professional.<sup>172, 173</sup>

Figure 6 shows the main steps in the development of a personalised tobacco cessation plan. Patients can make their own quit plan [here](#).

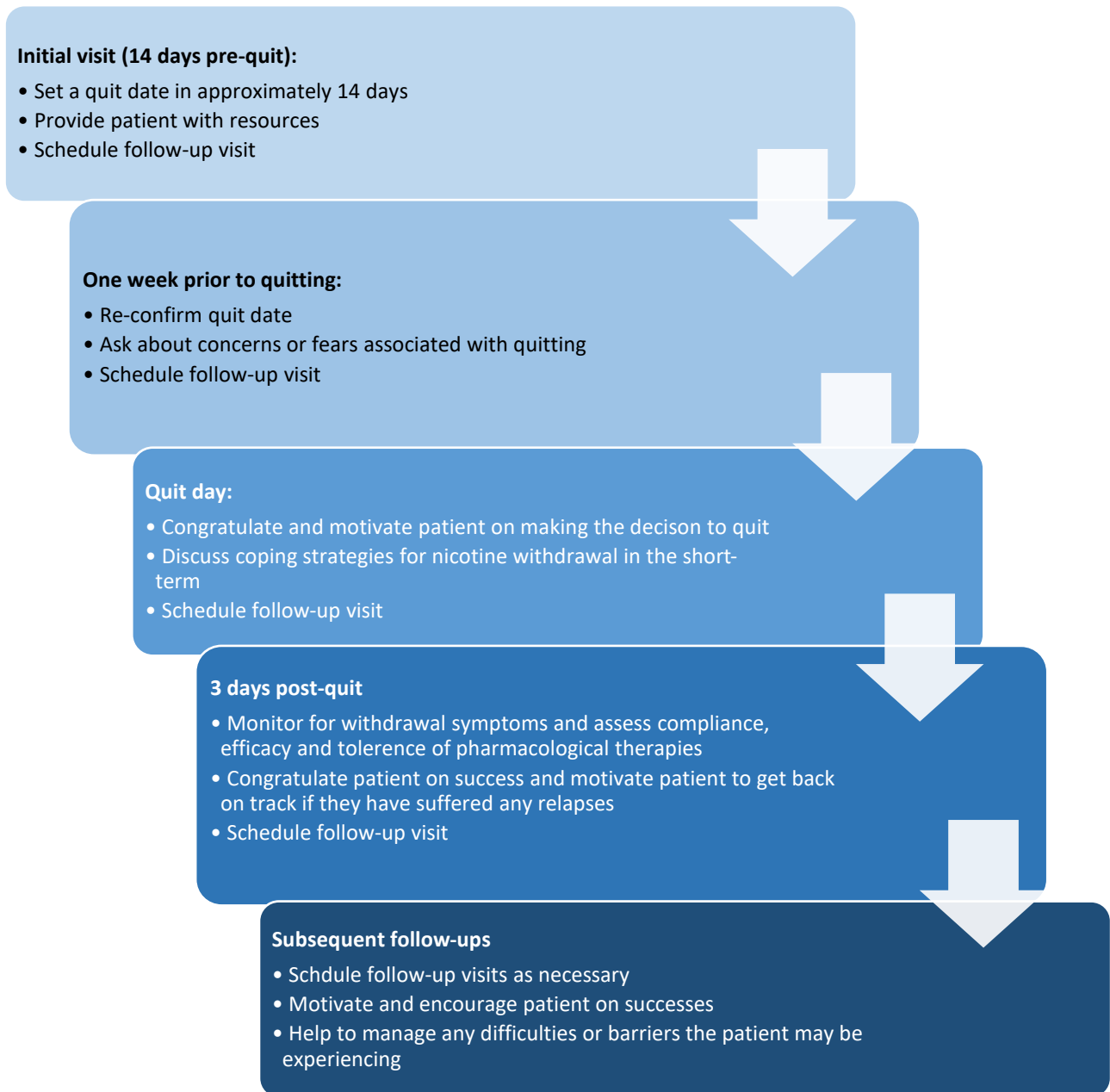
Figure 6. Steps to personalise a tobacco cessation plan<sup>173</sup>

It is recommended that pharmacists regularly review and evaluate their pharmacist-led programmes and activities. This will enable the pharmacy team to identify strengths, weaknesses, opportunities and threats. Pharmacists play a crucial role in combating the negative impact of tobacco use on public health by ensuring that these programmes cater to the needs of patients participating in them. Follow-up care is an essential part of the process of helping patients quit tobacco use, and multiple visits are often necessary to provide optimal care. An example of a multi-session intensive tobacco cessation programme is the [Quit Using and Inhaling Tobacco](#) (QUIT) programme by the Canadian Pharmacists Association, which offers a suggested outline for a follow-up plan with patients (see Figure 7).<sup>161</sup>

Pharmacists should ensure that they are available to patients throughout the entire process of quitting tobacco use. Regular follow-up with patients allows pharmacists to identify potential obstacles and intervene before a relapse occurs. A useful strategy to improve follow-up is to schedule the next appointment at each interaction, which reduces the risk of losing patients in the process. Statistics show that around 22% of tobacco users relapse within three months,<sup>174</sup> and between years 1 and 5 after quitting, 35–40% of tobacco users relapse.<sup>175</sup> Therefore, it is essential for pharmacists to provide long-term follow-up care to all patients who have a tobacco use history to help prevent relapse and ensure successful cessation.



Figure 7. Quit Using and Inhaling Tobacco (QUIT) follow up plan<sup>161</sup>



## 5 Tobacco cessation campaigns and programmes

Tobacco cessation campaigns are critical in reducing the prevalence of tobacco use worldwide. With the availability of well-documented research and essential data on the harmful effects of tobacco on health, countries of all regions ought to fight against tobacco use. These campaigns can take many forms, including public educational programmes, health advertisements and tailored community programmes. Targeted messaging emphasises components of immediate health benefits such as the reduced risk of cardiovascular disease or lung cancer. These campaigns provide resources for individuals attempting to quit tobacco use, including information on the type of therapies, support groups, and treatment. Pharmacists are often the first point of contact for individuals in tobacco cessation efforts. They work with other healthcare providers, health-related organisations and community support groups to promote tobacco cessation campaigns. Here are some examples where pharmacists around the globe play crucial roles in tobacco cessation.

Community outreach programmes among countries in Asia, such as Malaysia and Singapore, involve pharmacists visiting schools and public spaces to raise awareness of the dangers of tobacco use and promote tobacco cessation efforts. Recent campaigns in Malaysia include the Smoke-Free Generation Initiative; Malaysian Quit Smoking Services, or mQuit Programme, initiated in 2015, and KOTAK or Kesihatan Oral Tanpa Rokok (Oral Health Without Cigarettes) in 2016 initiated by the Ministry of Health.<sup>176-178</sup> With the launch of Certified Smoking Cessation Service Provider certification in 2004, many hospitals and community pharmacists helped individuals seek quit treatment at the quit smoking clinics designated at government hospital facilities.<sup>179, 180</sup> Pharmacists provide counselling services and NRT at the clinics. In Singapore, the national smoking cessation programme (IQuit) raised quit smoking awareness, whereby 10,000 individuals signed up for the programme. The Health Promotion Board reported that over 200 smoking cessation “touch points” in healthcare facilities and community retail pharmacies have successfully recruited them. This initiative includes information dissemination on a toll-free quitline for those seeking help in tobacco cessation and counselling in schools for young people.<sup>181, 182</sup>

The Pharmacy Guild of Australia supports the National Tobacco Campaign, which aims to reduce tobacco use rates in the country.<sup>183</sup> Pharmacists in Australia encouraged tobacco users to quit by providing information about tobacco cessation products and offering counselling and group support. In addition to the national campaign and quitline, many independent pharmacies took up the challenge by implementing tobacco cessation services as their own anti-tobacco initiatives. Australian pharmacists enhanced culturally appropriate services for the Aboriginal and Torres Strait Islander communities with reduced-cost, subsidised tobacco cessation medicines.<sup>184</sup> Similarly, in New Zealand, health programmes such as The Smokefree Aotearoa 2025 Action Plan offer continuous support for pharmacists to eradicate the harm of smoked tobacco products. Pharmacists provide personalised quit-smoking plans with a Quitpack and Quitcard, whereby the tobacco users obtain subsidised NRT products such as nicotine patches, gum and lozenges.<sup>185, 186</sup>

The Stoptober campaign initiated in 2012 in the UK has raised awareness and the desire to cease smoking.<sup>187</sup> This campaign consists of a quit challenge within 28 days, making it a social movement involving various approaches via social networking, motivational strategies using personal stories, and setting SMART goals for behaviour change. Pharmacists are crucial in providing intensive support with guidance and advice. Community pharmacies provide brief advice during their involvement in local and national campaigns such as No Smoking Day. As a follow-up, trained pharmacists provide structured tobacco cessation interventions at their pharmacies or offer referrals to their local stop-tobacco use service provider.<sup>188, 189</sup>

In 2018, the American Pharmacists Association launched a campaign, Pharmacists for Healthier Lives, which raised awareness of pharmacists' various healthcare services. The smoking cessation certification programme encourages more pharmacists to help individuals quit smoking. Other campaigns, such as Stay Smokefree For Good, reassures the public to get help via QuitGuide, online access to counselling and motivation services.<sup>190</sup> In Canada, pharmacists' quit smoking services or quit-coaches are accessible according to province and territory. The national campaign, Smoke Free Curious, help the public to identify appropriate resources and tools and delivers free trial NRT for withdrawal symptoms. Furthermore, Quebec pharmacists promote smoking cessation services via a reward system for those able to quit-smoking within six weeks.<sup>191</sup> One of the most successful campaigns includes Break It Off, launched by Health Canada, reaching out to young adults with smoking cessation resources and support.

More examples of campaigns and programmes promoted by pharmacists can be found in the FIP publication "[Establishing tobacco-free communities A practical guide for pharmacists](#)".

## 6 Referral and interprofessional collaboration to support tobacco cessation

Referral and interprofessional collaboration are important elements in supporting individuals to quit tobacco. Pharmacists can play a key role in this process by:

- **Referral to healthcare providers:** Pharmacists can refer individuals to healthcare providers, such as primary care physicians, specialists, or quitline services, for additional support and resources in quitting.
- **Collaboration with other healthcare professionals:** Pharmacists can work with other healthcare professionals, such as physicians, nurses, and psychologists, to provide comprehensive and coordinated care for individuals trying to quit tobacco.
- **Sharing of information and patient data:** Pharmacists can share information and patient data with other healthcare professionals to ensure continuity of care and improve patient outcomes.
- **Integration into primary care:** Pharmacists can work with primary care providers to integrate tobacco cessation services into routine primary care, ensuring that individuals receive comprehensive and coordinated care.
- **Coordination of medication management:** Pharmacists can coordinate medication management for individuals quitting tobacco, ensuring that individuals receive appropriate and effective medicines and monitoring for any adverse effects.

When patients are severely addicted to tobacco, pharmacists may need to refer them to another healthcare professional for additional support. It is also important for pharmacists to consider the impact of tobacco use on patients with underlying diseases, such as cardiovascular or respiratory conditions. In these cases, quitting tobacco use may be critical for managing the disease. Patients who are ready to quit because of their underlying disease should be referred to their primary care provider for evaluation of the quit strategy and follow-up.

Interprofessional collaboration is essential for effective tobacco cessation support. The 2019 updated Statement on Interprofessional Collaborative Practice by the World Health Professions Alliance<sup>192</sup> and the 2010 FIP Statement on Collaborative Pharmacy Practice<sup>193</sup> highlight the importance of integrating pharmacists into healthcare teams to improve patient outcomes. Working in close collaboration with other healthcare professionals allows pharmacists to coordinate a patient's therapeutic care as prescribed by a physician or other healthcare provider, and contribute to increased health outcomes. For example, a physician may prescribe medication to help manage withdrawal symptoms, while a pharmacist can provide advice on proper dosing and potential side effects. At the same time, a mental health professional may provide counselling and behavioural therapy to help patients cope with the stress and triggers associated with quitting tobacco.

Overall, effective tobacco cessation support requires a collaborative approach that involves multiple healthcare professionals working together to provide comprehensive care to patients. Pharmacists play a critical role in this process, both in providing direct support to patients and referring them to other professionals where necessary.

## 7 Conclusions

Tobacco use is recognised as a major public health problem worldwide, with a significant impact on the health of individuals and the healthcare system. As healthcare costs continue to rise and healthcare workers face increasing demands for their interventions and services, it is vital to recognise the potential contribution of pharmacists and their unique skills and knowledge in achieving better health outcomes for all.

Pharmacists have a special ability to interact with the public, enabling them to effectively reach and support patients throughout the tobacco cessation process. From health promotion, to screening, to assessment, to intervention and follow-up, pharmacists have a vital role to play in providing comprehensive and coordinated care to tobacco cessation patients. Their ability to provide personalised and accessible care makes them an invaluable asset in improving public health and reducing the burden of tobacco use on healthcare systems.

This handbook serves as a comprehensive guide for pharmacists on tobacco cessation. It emphasises the critical role of pharmacists in helping people to quit tobacco use and highlights different strategies that pharmacists can use to provide comprehensive and coordinated care to patients. The handbook emphasises the importance of interprofessional collaboration and the integration of tobacco cessation services into routine primary healthcare by pharmacists. It also highlights the need to consider the impact of tobacco use, and particularly smoking, on patients with underlying medical conditions and the importance of referring them to primary care providers for assessment and follow-up.

By using the information and strategies outlined in this handbook, pharmacists can effectively support patients in their tobacco cessation efforts and improve patient outcomes. We hope that this handbook will be a valuable resource for pharmacists around the world in their efforts to provide effective tobacco cessation support.

## 8 References

1. NCD Alliance. Tobacco Use [Internet]. updated [accessed: 28 March 2023]. Available at: <https://ncdalliance.org/why-ncds/risk-factors-prevention/tobacco-use>.
2. NCD Alliance. The NCD Alliance: Putting non-communicable diseases on the global agenda [Internet]. updated [accessed: 28 March 2023]. Available at: [https://ncdalliance.org/sites/default/files/rfiles/NCDA\\_Tobacco\\_and\\_Health.pdf](https://ncdalliance.org/sites/default/files/rfiles/NCDA_Tobacco_and_Health.pdf).
3. World Health Organization. WHO Framework Convention on Tobacco Control. Geneva: Organization WH [Internet]. 2003. [accessed: 28 March 2023]. Available at: <https://apps.who.int/iris/bitstream/handle/10665/42811/9241591013.pdf>.
4. World Health Organization. It's time to invest in cessation: the global investment case for tobacco cessation. Geneva: Organization WH [Internet]. 2021. [accessed: 28 March 2023]. Available at: <https://www.who.int/publications/i/item/9789240039308>.
5. World Health Organization. MPOWER [Internet]. updated [accessed: Available at: <https://www.who.int/initiatives/mpower>.
6. World Health Organization. Quitting tobacco [Internet]. updated [accessed: 28 March 2023]. Available at: <https://www.who.int/activities/quitting-tobacco>.
7. World Health Organization. Pharmacists and action on tobacco.: [Internet]. 1998. [accessed: 28 March 2023]. Available at: <http://apps.who.int/iris/bitstream/10665/108128/1/E61288.pdf>.
8. Consejo General de Colegios Oficiales de Farmacéuticos. Tabaquismo y deshabituación tabáquica [Internet]. updated [accessed: 28 March 2023]. Available at: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/<https://www.cofbadajoz.com/wp-content/uploads/2018/03/TABAQUISMO-Y-DESHABITUACIO%CC%81N.pdf>.
9. World Health Organization. Tobacco [Internet]. updated [accessed: 28 March 2023]. Available at: [https://www.who.int/health-topics/tobacco#tab=tab\\_1](https://www.who.int/health-topics/tobacco#tab=tab_1).
10. World Health Organization. Tobacco: Key facts [Internet]. 2022. updated [accessed: 28 March 2023]. Available at: <https://www.who.int/news-room/fact-sheets/detail/tobacco>.
11. American NonSmokers' Rights Foundation (ANRF). Thirdhand Smoke [Internet]. 2023. updated [accessed: 28 March 2023]. Available at: <https://no-smoke.org/smokefree-threats/thirdhand-smoke/>.
12. World Health Organization. Tobacco control [Internet]. updated [accessed: 28 March 2023]. Available at: <https://www.who.int/bangladesh/health-topics/tobacco>.
13. World Health Organization. Toolkit for delivering the 5A's and 5R's brief tobacco interventions in primary care. Geneva: Organization WH [Internet]. 2014. [accessed: 28 March 2023]. Available at: <https://www.paho.org/en/documents/toolkit-delivering-5as-and-5rs-brief-tobacco-interventions-primary-care>.
14. Hammerich A, El-Awa F, Latif NA et al. Tobacco is a threat to the environment and human health. East Mediterr Health J. 2022;28(5):319-20. [accessed: 8 May 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/35670435>.
15. Centers for Disease Control and Prevention (US). Environmental Impacts of the Tobacco Lifecycle [Internet]. 2022. updated [accessed: 8 May 2022]. Available at: <https://www.cdc.gov/globalhealth/infographics/tobacco/tobacco-lifecycle.html>.
16. World Health Organization. WHO raises alarm on tobacco industry environmental impact [Internet]. 2022. updated [accessed: 8 May 2023]. Available at: <https://www.who.int/news/item/31-05-2022-who-raises-alarm-on-tobacco-industry-environmental-impact>.
17. World Health Organization. Tobacco: poisoning our planet [Internet]. 2022. updated [accessed: 8 May 2023]. Available at: <https://www.who.int/publications/i/item/9789240051287>.
18. World Health Organization. The WHO Framework Convention on Tobacco Control: an overview [Internet]. 2021. updated [accessed: 28 March 2023]. Available at: <https://fctc.who.int/publications/m/item/the-who-framework-convention-on-tobacco-control-an-overview>.
19. World Health Organization. WHO Framework Convention on Tobacco Control: Parties [Internet]. 2023. updated [accessed: 28 March 2023]. Available at: <https://fctc.who.int/who-fctc/overview/parties>.
20. Bialous S, Da Costa ESVL. Where next for the WHO Framework Convention on Tobacco Control? Tob Control. 2022;31(2):183-6. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/35241586>.

21. Matthes BK, Robertson L, Gilmore AB. Needs of LMIC-based tobacco control advocates to counter tobacco industry policy interference: insights from semi-structured interviews. *BMJ Open*. 2020;10(11):e044710. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/33243822>.
22. Kaur J, Rinkoo AV, Gouda HN et al. Implementation of MPOWER Package in the South-East Asia Region: Evidence from the WHO Report on the Global Tobacco Epidemic (2009-2021). *Asian Pac J Cancer Prev*. 2021;22(S2):71-80. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/34780141>.
23. World Health Organization. WHO report on the global tobacco epidemic 2019: offer help to quit tobacco use [Internet]. 2019. updated [accessed: 28 March 2023]. Available at: <https://www.who.int/publications/i/item/9789241516204>.
24. World Health Organization. WHO report on the global tobacco epidemic 2021: addressing new and emerging products. [Internet]. 2021. [accessed: 7 February 2023]. Available at: <https://www.who.int/publications/i/item/9789240032095>.
25. World Health Organization. Towards tobacco-free young people in the African Region [Internet]. 2014. updated [accessed: 5 May 2023]. Available at: <https://www.afro.who.int/publications/towards-tobacco-free-young-people-african-region>.
26. National Cancer Institute (NCI). Harms of Cigarette Smoking and Health Benefits of Quitting [Internet]. 2017. updated [accessed: 28 March 2023]. Available at: <https://www.cancer.gov/about-cancer/causes-prevention/risk/tobacco/cessation-fact-sheet>.
27. Yoshida K, Gowers KHC, Lee-Six H et al. Tobacco smoking and somatic mutations in human bronchial epithelium. *Nature*. 2020;578(7794):266-72. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/31996850>.
28. Pipe Tobacco – A Complete Guide [Internet]. updated [accessed: 28 March 2023]. Available at: <https://www.enjoydokka.com/guide/pipe-tobacco-guide/>.
29. Raymond BH, Collette-Merrill K, Harrison RG et al. The Nicotine Content of a Sample of E-cigarette Liquid Manufactured in the United States. *J Addict Med*. 2018;12(2):127-31. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/29280749>.
30. World Health Organization. Heated tobacco products: information sheet - 2nd edition [Internet]. 2020. updated [accessed: 28 March 2023]. Available at: <https://www.who.int/publications/i/item/WHO-HEP-HPR-2020.2>.
31. Barrington-Trimis JL, Urman R, Berhane K et al. E-Cigarettes and Future Cigarette Use. *Pediatrics*. 2016;138(1). [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/27296866>.
32. Bhatt JM, Ramphul M, Bush A. An update on controversies in e-cigarettes. *Paediatr Respir Rev*. 2020;36:75-86. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/33071065>.
33. Hava C. Shocking health hazards of vaping for young people. *Australian Pharmacist*. 2023. [accessed: 11 April 2023]. Available at: [https://www.australianpharmacist.com.au/shocking-health-hazards-vaping-young-people/?utm\\_source=Pharmaceutical+Society+of+Australia&utm\\_campaign=3796ada2c8-EMAIL\\_CAMPAIGN\\_2023\\_03\\_29&utm\\_medium=email&utm\\_term=0\\_4aee916820-3796ada2c8-85220939](https://www.australianpharmacist.com.au/shocking-health-hazards-vaping-young-people/?utm_source=Pharmaceutical+Society+of+Australia&utm_campaign=3796ada2c8-EMAIL_CAMPAIGN_2023_03_29&utm_medium=email&utm_term=0_4aee916820-3796ada2c8-85220939).
34. Hartmann-Boyce J, McRobbie H, Lindson N et al. Electronic cigarettes for smoking cessation. *Cochrane Database Syst Rev*. 2021;4(4):CD010216. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/33913154>.
35. Banks E, Yazidjoglou A, Brown S et al. Electronic cigarettes and health outcomes: umbrella and systematic review of the global evidence. *Med J Aust*. 2023;218(6):267-75. [accessed: 11 April 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/36939271>.
36. Sund LJ, Dargan PI, Archer JRH et al. E-cigarette or vaping-associated lung injury (EVALI): a review of international case reports from outside the United States of America. *Clin Toxicol (Phila)*. 2023;61(2):91-7. [accessed: 18 May 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/36636876>.
37. World Health Organization. E-cigarettes are harmful to health. [Internet]. 2020. [accessed: 7 February 2023]. Available at: <https://www.who.int/news/item/05-02-2020-e-cigarettes-are-harmful-to-health>.
38. Attar-Zadeh D. The role of e-cigarettes in treating tobacco dependence. *Primary Care Respiratory Update*. 2019;10(18). [accessed: 5 May 2023]. Available at: <https://www.pcrs-uk.org/sites/default/files/pcru/articles/2019-Autumn-Issue-18-RoleofECigs.pdf>.
39. Taylor A, Dunn K, Turfus S. A review of nicotine-containing electronic cigarettes-Trends in use, effects, contents, labelling accuracy and detection methods. *Drug Test Anal*. 2021;13(2):242-60. [accessed: 18 May 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/33450135>.

40. American Lung Association. Popcorn Lung: A Dangerous Risk of Flavored E-Cigarettes [Internet]. 2016. updated [accessed: 18 May 2023]. Available at: <https://www.lung.org/blog/popcorn-lung-risk-ecigs>.
41. Frinculescu A, Coombes G, Shine T et al. Analysis of illicit drugs in purchased and seized electronic cigarette liquids from the United Kingdom 2014-2021. *Drug Test Anal.* 2022. [accessed: 18 May 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/35466538>.
42. US Food & Drug Administration (FDA). Nicotine Is Why Tobacco Products Are Addictive [Internet]. 2022. updated [accessed: 5 May 2023]. Available at: <https://www.fda.gov/tobacco-products/health-effects-tobacco-use/nicotine-why-tobacco-products-are-addictive>.
43. Benowitz NL. Nicotine addiction. *N Engl J Med.* 2010;362(24):2295-303. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/20554984>.
44. National Institute on Drug Abuse. Mind Matters: The Body's Response to Nicotine, Tobacco and Vaping [Internet]. 2019. updated [accessed: 28 March 2023]. Available at: <https://nida.nih.gov/research-topics/parents-educators/lesson-plans/mind-matters/nicotine-tobacco-vaping#:~:text=How%20does%20nicotine%20work%3F,good%20feelings%20all%20at%20once>.
45. Linneberg A, Jacobsen RK, Skaaby T et al. Effect of Smoking on Blood Pressure and Resting Heart Rate: A Mendelian Randomization Meta-Analysis in the CARTA Consortium. *Circ Cardiovasc Genet.* 2015;8(6):832-41. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/26538566>.
46. Tiwari RK, Sharma V, Pandey RK et al. Nicotine Addiction: Neurobiology and Mechanism. *J Pharmacopuncture.* 2020;23(1):1-7. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/32322429>.
47. Martin LM, Sayette MA. A review of the effects of nicotine on social functioning. *Exp Clin Psychopharmacol.* 2018;26(5):425-39. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/29952615>.
48. National Cancer Institute (NCI). Nicotine Withdrawal [Internet]. updated [accessed: 28 March 2023]. Available at: <https://smokefree.gov/challenges-when-quitting/withdrawal>.
49. National Cancer Institute (NCI). Handling Nicotine Withdrawal and Triggers When You Decide To Quit Tobacco [Internet]. 2022. updated [accessed: 28 March 2023]. Available at: <https://www.cancer.gov/about-cancer/causes-prevention/risk/tobacco/withdrawal-fact-sheet>.
50. American Cancer Society. Why People Start Smoking and Why It's Hard to Stop [Internet]. 2022. updated [accessed: 28 March 2023]. Available at: <https://www.cancer.org/healthy/stay-away-from-tobacco/why-people-start-using-tobacco.html>.
51. American Heart Association. Why it's so hard to quit smoking [Internet]. 2018. updated [accessed: 28 March 2023]. Available at: <https://www.heart.org/en/news/2018/10/17/why-its-so-hard-to-quit-smoking>.
52. American Lung Association. Helping Smokers Quit Saves Money: 2011. updated [accessed: 28 March 2023]. Available at: <https://www.lung.org/getmedia/8d023b16-ea93-486b-a5d9-aed38c2daf4a/quit-smoking-saves-money.pdf.pdf>.
53. Huang S, Wei H, Yao T et al. The impact of smoking on annual healthcare cost: an econometric model analysis in China, 2015. *BMC Health Serv Res.* 2021;21(1):187. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/33639939>.
54. Hecht SS, Hatsukami DK. Smokeless tobacco and cigarette smoking: chemical mechanisms and cancer prevention. *Nat Rev Cancer.* 2022;22(3):143-55. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/34980891>.
55. Togawa K, Bhatti L, Tursan d'Espaignet E et al. WHO tobacco knowledge summaries: tobacco and cancer treatment outcomes. Geneva: World Health Organization [Internet]. 2018. [accessed: 28 March 2023]. Available at: <https://www.who.int/publications/i/item/WHO-NMH-PND-TKS-18.1>.
56. Tammemagi MC, Berg CD, Riley TL et al. Impact of lung cancer screening results on smoking cessation. *J Natl Cancer Inst.* 2014;106(6):dju084. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/24872540>.
57. Golcic M, Tomas I, Stevanovic A et al. Smoking Cessation after a Cancer Diagnosis: A Cross-Sectional Analysis in the Setting of a Developing Country. *Clin Pract.* 2021;11(3):509-19. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/34449569>.
58. deRuiter WK, Barker M, Rahimi A et al. Smoking Cessation Training and Treatment: Options for Cancer Centres. *Curr Oncol.* 2022;29(4):2252-62. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/35448157>.
59. Vineis P, Caporaso N. Tobacco and cancer: epidemiology and the laboratory. *Environ Health Perspect.* 1995;103(2):156-60. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/7737063>.

60. Molden E, Spigset O. [Tobacco smoking and drug interactions]. *Tidsskr Nor Laegeforen*. 2009;129(7):632-3. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/19337332>.
61. Petros WP, Younis IR, Ford JN et al. Effects of tobacco smoking and nicotine on cancer treatment. *Pharmacotherapy*. 2012;32(10):920-31. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/23033231>.
62. European Network for Smoking and Tobacco Prevention (ENSP). 2020 Guidelines for treating tobacco dependence [Internet]. 2020. updated [accessed: Available at: <https://ensp.network/2020-guidelines-english-edition/>].
63. World Health Organization. Regional Office for the Eastern Mediterranean. Smoking and cardiovascular health: messages to the public, women, youth and cardiologists. World Health Organization. Regional Office for the Eastern Mediterranean [Internet]. 2018. [accessed: 28 March 2023]. Available at: <https://apps.who.int/iris/handle/10665/361352>.
64. Kondo T, Nakano Y, Adachi S et al. Effects of Tobacco Smoking on Cardiovascular Disease. *Circ J*. 2019;83(10):1980-5. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/31462607>.
65. Messner B, Bernhard D. Smoking and cardiovascular disease: mechanisms of endothelial dysfunction and early atherogenesis. *Arterioscler Thromb Vasc Biol*. 2014;34(3):509-15. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/24554606>.
66. World Health Organization. Tobacco responsible for 20% of deaths from coronary heart disease [Internet]. 2020. updated [accessed: 28 March 2023]. Available at: <https://www.who.int/news/item/22-09-2020-tobacco-responsible-for-20-of-deaths-from-coronary-heart-disease>.
67. Prochaska JJ, Benowitz NL. Smoking cessation and the cardiovascular patient. *Curr Opin Cardiol*. 2015;30(5):506-11. [accessed: 5 May 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/26196657>.
68. Tiotiu A, Ioan I, Wirth N et al. The Impact of Tobacco Smoking on Adult Asthma Outcomes. *Int J Environ Res Public Health*. 2021;18(3). [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/33498608>.
69. Qin R, Liu Z, Zhou X et al. Adherence and Efficacy of Smoking Cessation Treatment Among Patients with COPD in China. *Int J Chron Obstruct Pulmon Dis*. 2021;16:1203-14. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/33958864>.
70. Finocchio E, Olivieri M, Nguyen G et al. Effects of Respiratory Disorders on Smoking Cessation and Re-Initiation in an Italian Cohort Study. *Int J Environ Res Public Health*. 2021;18(3). [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/33494306>.
71. Garcia T, Andrade S, Biral AT et al. Evaluation of smoking cessation treatment initiated during hospitalization in patients with heart disease or respiratory disease. *J Bras Pneumol*. 2018;44(1):42-8. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/29538542>.
72. Stavaux E, Goupil F, Barreau G et al. Use of a Smartphone Self-assessment App for a Tobacco-Induced Disease (COPD, Cardiovascular Diseases, Cancer) Screening Strategy and to Encourage Smoking Cessation: Observational Study. *JMIR Public Health Surveill*. 2022;8(2):e19877. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/35195530>.
73. Aghapour M, Raei P, Moghaddam SJ et al. Airway Epithelial Barrier Dysfunction in Chronic Obstructive Pulmonary Disease: Role of Cigarette Smoke Exposure. *Am J Respir Cell Mol Biol*. 2018;58(2):157-69. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/28933915>.
74. Centers for Disease Control and Prevention (US), National Center for Chronic Disease Prevention and Health Promotion (US), (US). *OoSaH. 7, Pulmonary Diseases. How Tobacco Smoke Causes Disease: The Biology and Behavioral Basis for Smoking-Attributable Disease: A Report of the Surgeon General*. Atlanta (GA)2010.
75. Willis DN, Liu B, Ha MA et al. Menthol attenuates respiratory irritation responses to multiple cigarette smoke irritants. *FASEB J*. 2011;25(12):4434-44. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/21903934>.
76. Willi C, Bodenmann P, Ghali WA et al. Active smoking and the risk of type 2 diabetes: a systematic review and meta-analysis. *JAMA*. 2007;298(22):2654-64. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/18073361>.
77. Wei X, E M, Yu S. A meta-analysis of passive smoking and risk of developing Type 2 Diabetes Mellitus. *Diabetes Res Clin Pract*. 2015;107(1):9-14. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/25488377>.
78. Sliwiska-Mosson M, Milnerowicz H. The impact of smoking on the development of diabetes and its complications. *Diab Vasc Dis Res*. 2017;14(4):265-76. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/28393534>.



79. Keith RJ, Al Rifai M, Carruba C et al. Tobacco Use, Insulin Resistance, and Risk of Type 2 Diabetes: Results from the Multi-Ethnic Study of Atherosclerosis. *PLoS One*. 2016;11(6):e0157592. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/27322410>.
80. Centers for Disease Control and Prevention. Smoking and Diabetes [Internet]. 2022. updated [accessed: 28 March 2023]. Available at: <https://www.cdc.gov/diabetes/library/features/smoking-and-diabetes.html>.
81. Goodwin RD, Zvolensky MJ, Keyes KM. Nicotine dependence and mental disorders among adults in the USA: evaluating the role of the mode of administration. *Psychol Med*. 2008;38(9):1277-86. [accessed: 8 May 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/18366824>.
82. Galiatsatos P, Oluyinka M, Min J et al. Prevalence of Mental Health and Social Connection among Patients Seeking Tobacco Dependence Management: A Pilot Study. *Int J Environ Res Public Health*. 2022;19(18). [accessed: 8 May 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/36142029>.
83. Pal A, Balhara YP. A Review of Impact of Tobacco Use on Patients with Co-occurring Psychiatric Disorders. *Tob Use Insights*. 2016;9:7-12. [accessed: 8 May 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/26997871>.
84. Champion J, Hewitt J, Shiers D et al. Pharmacy guidance on smoking and mental disorder. Royal College of Psychiatrists NPAaRPS [Internet]. 2017. [accessed: 28 March 2023]. Available at: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/[https://www.rcpsych.ac.uk/docs/default-source/improving-care/better-mh-policy/policy/pharmacy-guidance-smoking-and-mental-health-2017-update.pdf?sfvrsn=6f6015ad\\_2](https://www.rcpsych.ac.uk/docs/default-source/improving-care/better-mh-policy/policy/pharmacy-guidance-smoking-and-mental-health-2017-update.pdf?sfvrsn=6f6015ad_2).
85. World Health Organization. Adolescent and young adult health: 2022. updated [accessed: 28 March 2023]. Available at: <https://www.who.int/news-room/fact-sheets/detail/adolescents-health-risks-and-solutions>.
86. Centers for Disease Control and Prevention (US). Youth and Tobacco Use: 2022. updated [accessed: 3 May 2023]. Available at: [https://www.cdc.gov/tobacco/data\\_statistics/fact\\_sheets/youth\\_data/tobacco\\_use/index.htm](https://www.cdc.gov/tobacco/data_statistics/fact_sheets/youth_data/tobacco_use/index.htm).
87. Sanders A, Robinson C, Taylor SC et al. Using a Media Campaign to Increase Engagement With a Mobile-Based Youth Smoking Cessation Program. *Am J Health Promot*. 2018;32(5):1273-9. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/28925292>.
88. Sadeghi R, Mazloomi Mahmoodabad SS, Fallahzadeh H et al. Hookah is the enemy of health campaign: a campaign for prevention of hookah smoking among youth. *Health Promot Int*. 2020;35(5):1125-36. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/31687738>.
89. Hutchinson P, Leyton A, Meekers D et al. Evaluation of a multimedia youth anti-smoking and girls' empowerment campaign: SKY Girls Ghana. *BMC Public Health*. 2020;20(1):1734. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/33203403>.
90. Chan L, El-Haddad N, Freeman B et al. Evaluation of 'Shisha No Thanks' - a co-design social marketing campaign on the harms of waterpipe smoking. *BMC Public Health*. 2022;22(1):386. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/35197044>.
91. Lange S, Probst C, Rehm J et al. National, regional, and global prevalence of smoking during pregnancy in the general population: a systematic review and meta-analysis. *Lancet Glob Health*. 2018;6(7):e769-e76. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/29859815>.
92. Tarasi B, Cornuz J, Clair C et al. Cigarette smoking during pregnancy and adverse perinatal outcomes: a cross-sectional study over 10 years. *BMC Public Health*. 2022;22(1):2403. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/36544092>.
93. Schilling L, Spallek J, Maul H et al. Active and Passive Exposure to Tobacco and e-Cigarettes During Pregnancy. *Matern Child Health J*. 2021;25(4):656-65. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/33211261>.
94. Pereira B, Figueiredo B, Pinto TM et al. Effects of Tobacco Consumption and Anxiety or Depression during Pregnancy on Maternal and Neonatal Health. *Int J Environ Res Public Health*. 2020;17(21). [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/33158085>.
95. Tappin DM, MacAskill S, Bauld L et al. Smoking prevalence and smoking cessation services for pregnant women in Scotland. *Subst Abuse Treat Prev Policy*. 2010;5:1. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/20092650>.
96. Haviland L, Thornton AH, Carothers S et al. Giving infants a great start: launching a national smoking cessation program for pregnant women. *Nicotine Tob Res*. 2004;6 Suppl 2:S181-8. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/15203820>.

97. Harris JE, Balsa AI, Triunfo P. Tobacco control campaign in Uruguay: Impact on smoking cessation during pregnancy and birth weight. *J Health Econ*. 2015;42:186-96. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/25985121>.
98. Guo Q, Li Z, Jia S et al. Mechanism of Human Tubal Ectopic Pregnancy Caused by Cigarette Smoking. *Reprod Sci*. 2022. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/35962304>.
99. Haddad A, Davis AM. Tobacco Smoking Cessation in Adults and Pregnant Women: Behavioral and Pharmacotherapy Interventions. *JAMA*. 2016;315(18):2011-2. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/27163990>.
100. Gould GS, Havard A, Lim LL et al. Exposure to Tobacco, Environmental Tobacco Smoke and Nicotine in Pregnancy: A Pragmatic Overview of Reviews of Maternal and Child Outcomes, Effectiveness of Interventions and Barriers and Facilitators to Quitting. *Int J Environ Res Public Health*. 2020;17(6). [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/32204415>.
101. World Health Organization. Cardiovascular diseases [Internet]. updated [accessed: 28 March 2023]. Available at: [https://www.who.int/health-topics/cardiovascular-diseases#tab=tab\\_1](https://www.who.int/health-topics/cardiovascular-diseases#tab=tab_1).
102. Serrano-Alarcon M, Kunst AE, Bosdriesz JR et al. Tobacco control policies and smoking among older adults: a longitudinal analysis of 10 European countries. *Addiction*. 2019;114(6):1076-85. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/30868688>.
103. Kleykamp BA, Heishman SJ. The older smoker. *JAMA*. 2011;306(8):876-7. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/21862749>.
104. Muhammad T, Govindu M, Srivastava S. Relationship between chewing tobacco, smoking, consuming alcohol and cognitive impairment among older adults in India: a cross-sectional study. *BMC Geriatr*. 2021;21(1):85. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/33514331>.
105. Fai Sui C, Chiau Ming L. Chapter 53 - Pharmacist-led Smoking Cessation Services: Current and Future Perspectives. In: Preedy VR, editor. *Neuroscience of Nicotine: Mechanisms and Treatment*: Academic Press; 2019. p. 441-9.
106. Brock T, Taylor D, Wuliji T. Curbing the tobacco pandemic: The global role for pharmacy. London: The School of Pharmacy UoLaIPFF [Internet]. 2007. [accessed: 28 March 2023]. Available at: [https://www.fip.org/files/fip/news/curbing\\_global\\_pandemic.pdf](https://www.fip.org/files/fip/news/curbing_global_pandemic.pdf).
107. O'Reilly E, Frederick E, Palmer E. Models for pharmacist-delivered tobacco cessation services: a systematic review. *J Am Pharm Assoc (2003)*. 2019;59(5):742-52. [accessed: 25 November 2022]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/31307963>.
108. Appalasaamy JR, Selvaraj A, Wong YH et al. Effects of educational interventions on the smoking cessation service provided by community pharmacists: A systematic review. *Res Social Adm Pharm*. 2022;18(9):3524-33. [accessed: 25 November 2022]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/35168890>.
109. Carson-Chahhoud KV, Livingstone-Banks J, Sharrad KJ et al. Community pharmacy personnel interventions for smoking cessation. *Cochrane Database Syst Rev*. 2019;2019(10). [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/31684695>.
110. Peletidi A, Nabhani-Gebara S, Kayyali R. Smoking Cessation Support Services at Community Pharmacies in the UK: A Systematic Review. *Hellenic J Cardiol*. 2016;57(1):7-15. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/26856195>.
111. Brown TJ, Todd A, O'Malley C et al. Community pharmacy-delivered interventions for public health priorities: a systematic review of interventions for alcohol reduction, smoking cessation and weight management, including meta-analysis for smoking cessation. *BMJ Open*. 2016;6(2):e009828. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/26928025>.
112. Saba M, Diep J, Saini B et al. Meta-analysis of the effectiveness of smoking cessation interventions in community pharmacy. *J Clin Pharm Ther*. 2014;39(3):240-7. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/24749899>.
113. Perraudin C, Bugnon O, Pelletier-Fleury N. Expanding professional pharmacy services in European community setting: Is it cost-effective? A systematic review for health policy considerations. *Health Policy*. 2016;120(12):1350-62. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/28228230>.

114. Roberts NJ, Kerr SM, Smith SM. Behavioral interventions associated with smoking cessation in the treatment of tobacco use. *Health Serv Insights*. 2013;6:79-85. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/25114563>.
115. Rigotti NA. Pharmacotherapy for smoking cessation in adults [Internet]. 2023. updated [accessed: 28 March 2023]. Available at: <https://www.uptodate.com/contents/pharmacotherapy-for-smoking-cessation-in-adults#H13314646>.
116. Park ER. Behavioral approaches to smoking cessation [Internet]. 2023. updated [accessed: 28 March 2023]. Available at: [https://www.uptodate.com/contents/behavioral-approaches-to-smoking-cessation?topicRef=16635&source=see\\_link](https://www.uptodate.com/contents/behavioral-approaches-to-smoking-cessation?topicRef=16635&source=see_link).
117. Van Schayck OCP, Williams S, Barchilon V et al. Treating tobacco dependence: guidance for primary care on life-saving interventions. Position statement of the IPCRG. *NPJ Prim Care Respir Med*. 2017;27(1):38. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/28600490>.
118. Rigotti NA, Kruse GR, Livingstone-Banks J et al. Treatment of Tobacco Smoking: A Review. *JAMA*. 2022;327(6):566-77. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/35133411>.
119. Marin Armero A, Calleja Hernandez MA, Perez-Vicente S et al. Pharmaceutical care in smoking cessation. *Patient Prefer Adherence*. 2015;9:209-15. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/25678779>.
120. Beaupre LA, Hammal F, Stiegelmar R et al. A community-based pharmacist-led smoking cessation program, before elective total joint replacement surgery, markedly enhances smoking cessation rates. *Tob Induc Dis*. 2020;18:78. [accessed: 25 November 2022]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/33013274>.
121. Lertsinudom S, Kaewketthong P, Chankaew T et al. Smoking Cessation Services by Community Pharmacists: Real-World Practice in Thailand. *Int J Environ Res Public Health*. 2021;18(22). [accessed: 25 November 2022]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/34831660>.
122. Odukoya OO, Poluyi EO, Aina B et al. Pharmacist-led smoking cessation: The attitudes and practices of community pharmacists in Lagos state, Nigeria. A mixed methods survey. *Tobacco Prevention & Cessation*. 2016;2(January). [accessed: 25 November 2022]. Available at: <https://doi.org/10.18332/tpc/61546>.
123. World Health Organization. Training for primary care providers: brief tobacco interventions (WHO e-Learning course) [Internet]. updated [accessed: 28 March 2023]. Available at: <https://www.campusvirtualsp.org/en/node/30781>.
124. World Health Organization. WHO Framework Convention on Tobacco Control: guidelines for implementation: Article 14.: [Internet]. 2013 [accessed: 31 March 2023]. Available at: [https://fctc.who.int/docs/librariesprovider12/default-document-library/who-fctc-article-14.pdf?sfvrsn=9fdc75a\\_31&download=true](https://fctc.who.int/docs/librariesprovider12/default-document-library/who-fctc-article-14.pdf?sfvrsn=9fdc75a_31&download=true).
125. Baxter N. IPCRG. Desktop Helper No. 4 - Helping patients quit tobacco - 3rd edition [Internet]. 2019. updated [accessed: 28 March 2023]. Available at: <https://www.ipcr.org/desktophelpers/desktop-helper-no-4-helping-patients-quit-tobacco-3rd-edition>.
126. Papadakis S, McEwen A. Very brief advice on smoking PLUS (VBA+). Dorset, UK: [Internet]. 2021. [accessed: Available at: [https://www.ncsct.co.uk/publication\\_VBA+.php](https://www.ncsct.co.uk/publication_VBA+.php)].
127. Boutwell L, Cook L, Norman K et al. A Pharmacist's Guide for Smoking Cessation. Association AP [Internet]. 2014. [accessed: 28 March 2023]. Available at: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/[https://cdn.ymaws.com/www.aparx.org/resource/resmgr/CEs/CE\\_Winter\\_Smoking\\_Cessation.pdf](https://cdn.ymaws.com/www.aparx.org/resource/resmgr/CEs/CE_Winter_Smoking_Cessation.pdf).
128. Lindson N, Thompson TP, Ferrey A et al. Motivational interviewing for smoking cessation. *Cochrane Database Syst Rev*. 2019;7(7):CD006936. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/31425622>.
129. University of New Hampshire. Motivational Interviewing: The Basics, OARS [Internet]. updated [accessed: 28 March 2023]. Available at: <https://iod.unh.edu/sites/default/files/media/2021-10/motivational-interviewing-the-basics-oars.pdf>.
130. Zwar N, Richmond R, Borland R et al. Smoking Cessation Guidelines: for Australian general practice [Internet]. 2004. updated [accessed: 28 March 2023]. Available at: [https://untobaccocontrol.org/impldb/wp-content/uploads/reports/Australia\\_annex8\\_smoking\\_cessation\\_guidelines.pdf](https://untobaccocontrol.org/impldb/wp-content/uploads/reports/Australia_annex8_smoking_cessation_guidelines.pdf).
131. Jiloha RC. Pharmacotherapy of smoking cessation. *Indian J Psychiatry*. 2014;56(1):87-95. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/24574567>.
132. Barua RS, Rigotti NA, Benowitz NL et al. 2018 ACC Expert Consensus Decision Pathway on Tobacco Cessation Treatment: A Report of the American College of Cardiology Task Force on Clinical Expert Consensus Documents. *J Am Coll Cardiol*. 2018;72(25):3332-65. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/30527452>.

133. Lexicomp: Evidence-Based Drug Referential Content. Nortriptyline [Internet]. 2023. updated [accessed: 28 March 2023]. Available at: <https://www.wolterskluwer.com/en/solutions/lexicomp>.
134. Lexicomp: Evidence-Based Drug Referential Content. Cytisine [Internet]. 2023. updated [accessed: 28 March 2023]. Available at: <https://www.wolterskluwer.com/en/solutions/lexicomp>.
135. Tutka P, Vinnikov D, Courtney RJ et al. Cytisine for nicotine addiction treatment: a review of pharmacology, therapeutics and an update of clinical trial evidence for smoking cessation. *Addiction*. 2019;114(11):1951-69. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/31240783>.
136. Centers for Disease Control and Prevention (US). About Electronic Cigarettes (E-Cigarettes) [Internet]. 2022. updated [accessed: 28 March 2023]. Available at: [https://www.cdc.gov/tobacco/basic\\_information/e-cigarettes/about-e-cigarettes.html](https://www.cdc.gov/tobacco/basic_information/e-cigarettes/about-e-cigarettes.html).
137. Nogrady B. Australia bans all vapes except on prescription to stem use in children. *BMJ*. 2023;381:1014. [accessed: 25 May 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/37142274>.
138. Mersha AG, Gould GS, Bovill M et al. Barriers and Facilitators of Adherence to Nicotine Replacement Therapy: A Systematic Review and Analysis Using the Capability, Opportunity, Motivation, and Behaviour (COM-B) Model. *Int J Environ Res Public Health*. 2020;17(23). [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/33265956>.
139. Kroon LA. Drug interactions with smoking. *Am J Health Syst Pharm*. 2007;64(18):1917-21. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/17823102>.
140. Madsen HKL, Gullov M, Farver-Vestergaard I et al. [Smoking cessation and drug interactions]. *Ugeskr Laeger*. 2022;184(35). [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/36065858>.
141. Matkin W, Ordóñez-Mena JM, Hartmann-Boyce J. Telephone counselling for smoking cessation. The Cochrane database of systematic reviews. 2019;5(5). [accessed: 28 March 2023]. Available at: <https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD002850.pub4/full>.
142. Richter KP, Shireman TI, Ellerbeck EF et al. Comparative and cost effectiveness of telemedicine versus telephone counseling for smoking cessation. *J Med Internet Res*. 2015;17(5):e113. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/25956257>.
143. Rodriguez JA, Betancourt JR, Sequist TD et al. Differences in the use of telephone and video telemedicine visits during the COVID-19 pandemic. *Am J Manag Care*. 2021;27(1):21-6. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/33471458>.
144. Lancaster T, Stead LF. Self-help interventions for smoking cessation. *Cochrane Database Syst Rev*. 2005(3):CD001118. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/16034855>.
145. Altendorf M, Hoving C, Van Weert JC et al. Effectiveness of Message Frame-Tailoring in a Web-Based Smoking Cessation Program: Randomized Controlled Trial. *J Med Internet Res*. 2020;22(4):e17251. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/32242826>.
146. Livingstone-Banks J, Ordonez-Mena JM, Hartmann-Boyce J. Print-based self-help interventions for smoking cessation. *Cochrane Database Syst Rev*. 2019;1(1):CD001118. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/30623970>.
147. Piper ME, McCarthy DE, Baker TB. Assessing tobacco dependence: a guide to measure evaluation and selection. *Nicotine Tob Res*. 2006;8(3):339-51. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/16801292>.
148. Heatherton TF, Kozlowski LT, Frecker RC et al. The Fagerstrom Test for Nicotine Dependence: a revision of the Fagerstrom Tolerance Questionnaire. *Br J Addict*. 1991;86(9):1119-27. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/1932883>.
149. Ebbert JO, Patten CA, Schroeder DR. The Fagerstrom Test for Nicotine Dependence-Smokeless Tobacco (FTND-ST). *Addict Behav*. 2006;31(9):1716-21. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/16448783>.
150. Kawakami N, Takatsuka N, Inaba S et al. Development of a screening questionnaire for tobacco/nicotine dependence according to ICD-10, DSM-III-R, and DSM-IV. *Addict Behav*. 1999;24(2):155-66. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/10336098>.
151. Mushtaq N, Beebe LA. Assessment of the Tobacco Dependence Screener Among Smokeless Tobacco Users. *Nicotine Tob Res*. 2016;18(5):885-91. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/26718743>.

152. Etter JF, Le Houezec J, Perneger TV. A self-administered questionnaire to measure dependence on cigarettes: the cigarette dependence scale. *Neuropsychopharmacology*. 2003;28(2):359-70. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/12589389>.
153. Shiffman S, Waters A, Hickcox M. The nicotine dependence syndrome scale: a multidimensional measure of nicotine dependence. *Nicotine Tob Res*. 2004;6(2):327-48. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/15203807>.
154. IARC Handbooks of Cancer Prevention. Tobacco Control, Vol. 12: Methods for Evaluating Tobacco Control Policies. Lyon, France: [Internet]. 2008. [accessed: 28 March 2023]. Available at: <https://publications.iarc.fr/Book-And-Report-Series/Iarc-Handbooks-Of-Cancer-Prevention/Methods-For-Evaluating-Tobacco-Control-Policies-2008>.
155. National Cancer Institute (NCI). Hooked on Nicotine Checklist (HONC) [Internet]. 2020. updated [accessed: 28 March 2023]. Available at: <https://cancercontrol.cancer.gov/brp/tcrb/measures-guide/hooked-on-nicotine-checklist>.
156. DiFranza JR, Savageau JA, Fletcher K et al. Measuring the loss of autonomy over nicotine use in adolescents: the DANDY (Development and Assessment of Nicotine Dependence in Youths) study. *Arch Pediatr Adolesc Med*. 2002;156(4):397-403. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/11929376>.
157. Lim KH, Cheong YL, Sulaiman N et al. Agreement between the Fagerström test for nicotine dependence (FTND) and the heaviness of smoking index (HSI) for assessing the intensity of nicotine dependence among daily smokers. *Tobacco Induced Diseases*. 2022;20(November):1-6. [accessed: Available at: <https://doi.org/10.18332/tid/155376>].
158. National Institute on Drug Abuse. Heaviness of Smoking Index [Internet]. 2016. updated [accessed: 28 March 2023]. Available at: <https://datashare.nida.nih.gov/instrument/heaviness-of-smoking-index>.
159. Piper ME, Piasecki TM, Federman EB et al. A multiple motives approach to tobacco dependence: the Wisconsin Inventory of Smoking Dependence Motives (WISDM-68). *J Consult Clin Psychol*. 2004;72(2):139-54. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/15065950>.
160. Piper ME, McCarthy DE, Bolt DM et al. Assessing dimensions of nicotine dependence: an evaluation of the Nicotine Dependence Syndrome Scale (NDSS) and the Wisconsin Inventory of Smoking Dependence Motives (WISDM). *Nicotine Tob Res*. 2008;10(6):1009-20. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/18584464>.
161. International Pharmaceutical Federation (FIP). Establishing tobacco-free communities: A practical guide for pharmacists. The Hague: International Pharmaceutical Federation [Internet]. 2015. [accessed: 28 March 2023]. Available at: <https://www.fip.org/file/1358>.
162. Prochaska JO, DiClemente CC. Stages and processes of self-change of smoking: toward an integrative model of change. *J Consult Clin Psychol*. 1983;51(3):390-5. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/6863699>.
163. Centre for Addiction and Mental Health (CAMH). Smoking Cessation: Assessment [Internet]. 2021. updated [accessed: 28 March 2023]. Available at: <https://www.camh.ca/en/professionals/treating-conditions-and-disorders/smoking-cessation/smoking-cessation---assessment>.
164. Boudreaux ED, Sullivan A, Abar B et al. Motivation rulers for smoking cessation: a prospective observational examination of construct and predictive validity. *Addict Sci Clin Pract*. 2012;7(1):8. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/23186265>.
165. Case Western Reserve University. Readiness Ruler [Internet]. 2010. updated [accessed: 28 March 2028]. Available at: <https://case.edu/socialwork/centerforebp/resources/readiness-ruler>.
166. Keskitalo K, Broms U, Heliövaara M et al. Association of serum cotinine level with a cluster of three nicotinic acetylcholine receptor genes (CHRNA3/CHRNA5/CHRN4) on chromosome 15. *Hum Mol Genet*. 2009;18(20):4007-12. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/19628476>.
167. Centers for Disease Control and Prevention (US). Cotinine [Internet]. 2017. updated [accessed: 28 March 2023]. Available at: [https://www.cdc.gov/biomonitoring/Cotinine\\_BiomonitoringSummary.html](https://www.cdc.gov/biomonitoring/Cotinine_BiomonitoringSummary.html).
168. Johnson-Davis KL. Nicotine Exposure and Metabolites [Internet]. 2022. updated [accessed: 28 March 2023]. Available at: <https://arupconsult.com/content/nicotine-metabolites>.
169. Ryter SW, Choi AM. Carbon monoxide in exhaled breath testing and therapeutics. *J Breath Res*. 2013;7(1):017111. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/23446063>.

170. Queensland Government SRCN. Carbon Monoxide (CO) Monitoring for Smoking Management: A brief guide for staff. Queensland Health) SoQQ [Internet]. 2021. [accessed: 28 March 2023]. Available at: <https://clinicalexcellence.qld.gov.au/sites/default/files/docs/clinical-networks/co-monitoring-guide.pdf>.
171. World Health Organization. Carbon monoxide. Air Quality Guidelines - Second Edition: World Health Organization,; 2000.
172. World Health Organization. A guide for tobacco users to quit. Geneva: World Health Organization [Internet]. 2014. [accessed: 28 March 2023]. Available at: <https://apps.who.int/iris/handle/10665/112833>.
173. National Cancer Institute (NCI): Smokefree.gov. Quitting Starts Now. Make Your Quit Plan. [Internet]. updated [accessed: 28 March 2023]. Available at: <https://smokefree.gov/build-your-quit-plan>.
174. Hughes JR, Solomon LJ, Naud S et al. Natural history of attempts to stop smoking. Nicotine Tob Res. 2014;16(9):1190-8. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/24719491>.
175. Hajek P, Stead LF, West R et al. Relapse prevention interventions for smoking cessation. Cochrane Database Syst Rev. 2009(1):CD003999. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/19160228>.
176. Southeast Asia Tobacco Control Alliance. Malaysia: No smoking campaigns having impact on the young: 2018. updated [accessed: 28 March 2023]. Available at: <https://seatca.org/malaysia-no-smoking-campaigns-having-impact-on-the-young/>.
177. Ministry of Health Malaysia. KPK Press Statement 17 May 2016: Ops Puntung: 2016. updated [accessed: 28 March 2023]. Available at: [https://kpkasihatan-com.translate.goog/2016/05/17/kenyataan-akhbar-kpk-17-mei-2016-ops-puntung/? x\\_tr sl=ms& x\\_tr tl=en& x\\_tr hl=en& x\\_tr pto=sc](https://kpkasihatan-com.translate.goog/2016/05/17/kenyataan-akhbar-kpk-17-mei-2016-ops-puntung/? x_tr sl=ms& x_tr tl=en& x_tr hl=en& x_tr pto=sc).
178. Hassan N, Baharom N, Dawam ND et al. Strengthening quit smoking services in Malaysia through Malaysia Quit (mQuit) Program. Tobacco Induced Diseases. 2018;16(1). [accessed: 28 March 2023]. Available at: <https://doi.org/10.18332/tid/84344>.
179. Fai SC, Yen GK, Malik N. Quit rates at 6 months in a pharmacist-led smoking cessation service in Malaysia. Can Pharm J (Ott). 2016;149(5):303-12. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/27708676>.
180. Commonwealth Pharmacists Association. Training Community Pharmacists in Malaysia as Smoking Cessation Service Providers [Internet]. updated [accessed: 28 March 2023]. Available at: <https://commonwealthpharmacy.org/training-community-pharmacists-in-malaysia-as-smoking-cessation-service-providers/>.
181. Singapore Government Agency. Health Promotion Board Annual Report 2015/2016 [Internet]. 2016. updated [accessed: 28 March 2023]. Available at: [https://www.nas.gov.sg/archivesonline/government\\_records/record-details/211f1651-8632-11e6-9af5-0050568939ad](https://www.nas.gov.sg/archivesonline/government_records/record-details/211f1651-8632-11e6-9af5-0050568939ad).
182. Amul GGH, Pang T. Progress in tobacco control in Singapore: Lessons and challenges in the implementation of the Framework Convention on Tobacco Control. Asia Pacific Policy Stud. 2018;5:102–21. [accessed: 28 March 2023]. Available at: <https://onlinelibrary.wiley.com/doi/10.1002/app5.222>.
183. Hill D, Carroll T. Australia's National Tobacco Campaign. Tob Control. 2003;12 Suppl 2(Suppl 2):ii9-14. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/12878768>.
184. Zwar NA. Smoking cessation. Aust J Gen Pract. 2020;49(8):474-81. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/32738868>.
185. New Zealand Government. Quitting smoking [Internet]. 2021. updated [accessed: 28 March 2023]. Available at: <https://www.health.govt.nz/your-health/healthy-living/addictions/quitting-smoking>.
186. Edwards R, Hoek J, Waa A. New Zealand: Ground-breaking action plan may help country achieve its Smokefree 2025 goal [Internet]. 2022. updated [accessed: 28 March 2023]. Available at: <https://blogs.bmj.com/tc/2022/01/12/new-zealand-ground-breaking-action-plan-may-help-country-achieve-its-smokefree-2025-goal/>.
187. Koshy G. How effective has Stoptober been in helping smokers to quit [Internet]. 2022. updated [accessed: 28 March 2023]. Available at: <https://www.thriveagency.uk/insights/how-effective-has-stoptober-been-in-helping-smokers-to-quit/>.
188. National Health Service (NHS) England. NHS community pharmacy smoking cessation service [Internet]. updated [accessed: 28 March 2023]. Available at: <https://www.england.nhs.uk/primary-care/pharmacy/nhs-smoking-cessation-transfer-of-care-pilot-from-hospital-to-community-pharmacy/>.
189. Pharmaceutical Services Negotiating Committee (PSNC). Healthy Living Pharmacy: Holding an awareness event/campaign on smoking [Internet]. 2022. updated [accessed: 28 March 2023]. Available at: <https://psnc.org.uk/national-pharmacy-services/essential-services/healthy-living-pharmacies/health-promotion-ideas-for-pharmacy-teams/holding-an-awareness-eventcampaign-on-smoking/>.

190. National Cancer Institute (NCI): Smokefree.gov. QuitGuide [Internet]. updated [accessed: 28 March 2023]. Available at: <https://smokefree.gov/tools-tips/apps/quitguide>.
191. Government of Canada. Quitting smoking: Provincial and territorial services [Internet]. 2022. updated [accessed: 28 March 2023]. Available at: <https://www.canada.ca/en/health-canada/services/smoking-tobacco/quit-smoking/provincial-territorial-services.html>.
192. The World Health Professions Alliance (WHPA). WHPA Statement on Interprofessional Collaborative Practice [Internet]. 2019. updated [accessed: 28 March 2023]. Available at: <https://www.whpa.org/news-resources/statements/whpa-statement-interprofessional-collaborative-practice>.
193. International Pharmaceutical Federation (FIP). FIP Statement of Policy Collaborative Practice [Internet]. 2009 updated [accessed: 28 March 2023]. Available at: <https://www.fip.org/file/1418>.
194. Borland R, Yong HH, O'Connor RJ et al. The reliability and predictive validity of the Heaviness of Smoking Index and its two components: findings from the International Tobacco Control Four Country study. *Nicotine Tob Res.* 2010;12 Suppl(Suppl 1):S45-50. [accessed: 28 March 2023]. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/20889480>.

# Appendices

## Appendix 1. The Fagerström Test for Nicotine Dependence<sup>148</sup>

Answer each question by placing a tick in the appropriate box		
1. How soon after waking do you smoke your first cigarette?	Within 5 minutes 5–30 minutes 31–60 minutes After 60 minutes	<input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 0
2. Do you find it difficult to refrain from smoking in places where it is forbidden (examples: church, library, etc)?	Yes No	<input type="checkbox"/> 1 <input type="checkbox"/> 0
3. Which cigarette would you hate to give up?	The first in the morning Any other	<input type="checkbox"/> 1 <input type="checkbox"/> 0
4. How many cigarettes do you smoke each day?	10 or fewer 11–20 21–30 31 or more	<input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3
5. Do you smoke more frequently during the first hours after awakening than during the rest of the day?	Yes No	<input type="checkbox"/> 1 <input type="checkbox"/> 0
6. Do you smoke even if you are sick in bed most of the day?	Yes No	<input type="checkbox"/> 1 <input type="checkbox"/> 0
		<b>Total score</b>
<b>Score</b>	Fewer than 4 points = minimally dependent 4–6 points = moderately dependent 7–10 points = highly dependent	



## Appendix 2. Tobacco dependence screener<sup>150</sup>

1. Smoking more than intended	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Unsuccessful effort to quit smoking	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Craving for tobacco	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Withdrawal symptoms	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Smoking to avoid withdrawal symptoms	<input type="checkbox"/> Yes <input type="checkbox"/> No
6. Smoking despite a serious illness	<input type="checkbox"/> Yes <input type="checkbox"/> No
7. Smoking despite health problems	<input type="checkbox"/> Yes <input type="checkbox"/> No
8. Smoking despite mental problems	<input type="checkbox"/> Yes <input type="checkbox"/> No
9. Feeling dependent on tobacco	<input type="checkbox"/> Yes <input type="checkbox"/> No
10. Giving up important activities to smoke	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>Score</b>	<p>Number of “yes” responses used as the scale score Score ranges from 0–10</p> <p>Each question was asked using a dichotomous response category (i.e., “yes” or “no”). If the question was not applicable to the subject (e.g., a question on withdrawal symptoms for those who have never quit smoking), the subject was instructed to answer “no”.</p>

## Appendix 3. Cigarette dependence scale<sup>152</sup>

Questions	Response options	Recoding
1. Please rate your addiction to cigarettes on a scale of 0 to 100: <ul style="list-style-type: none"> <li>I am NOT addicted to cigarettes = 0</li> <li>I am extremely addicted to cigarettes = 100</li> </ul>	___ Addiction	0–20 = 1 21–40 = 2 41–60 = 3 61–80 = 4 81–100 = 5
2. On average, how many cigarettes do you smoke per day?	___ Cigarettes/ day	0–5 = 1 6–10 = 2 11–20 = 3 21–29 = 4 30+ = 5
3. Usually, how soon after waking up do you smoke your first cigarette?	___ Minutes	0–5 = 5 6–15 = 4 16–30 = 3 31–60 = 2 61+ = 1
4. For you, quitting smoking for good would be:	Impossible = 5 Very difficult = 4 Fairly difficult = 3 Fairly easy = 2 Very easy = 1	
<b>Please indicate whether you agree with each of the following statements:</b> 5. After a few hours without smoking, I feel an irresistible urge to smoke	Totally disagree = 1 Somewhat disagree = 2 Neither agree nor disagree = 3 Somewhat agree = 4 Fully agree = 5	
6. The idea of not having any cigarettes causes me stress	Totally disagree = 1 Somewhat disagree = 2 Neither agree nor disagree = 3 Somewhat agree = 4 Fully agree = 5	
7. Before going out, I always make sure that I have cigarettes with me	Totally disagree = 1 Somewhat disagree = 2 Neither agree nor disagree = 3 Somewhat agree = 4 Fully agree = 5	
8. I am a prisoner of cigarettes	Totally disagree = 1 Somewhat disagree = 2 Neither agree nor disagree = 3 Somewhat agree = 4 Fully agree = 5	
9. I smoke too much	Totally disagree = 1 Somewhat disagree = 2 Neither agree nor disagree = 3 Somewhat agree = 4 Fully agree = 5	

10. Sometimes I drop everything to go out and buy cigarettes	Totally disagree = 1 Somewhat disagree = 2 Neither agree nor disagree = 3 Somewhat agree = 4 Fully agree = 5	
11. I smoke all the time	Totally disagree = 1 Somewhat disagree = 2 Neither agree nor disagree = 3 Somewhat agree = 4 Fully agree = 5	
12. I smoke despite the risks to my health	Totally disagree = 1 Somewhat disagree = 2 Neither agree nor disagree = 3 Somewhat agree = 4 Fully agree = 5	

## Appendix 4. Heaviness of Smoking Index<sup>194</sup>

Question	Response	Point
1. How many cigarettes do you typically smoke per day?	10 or fewer	0 points
	11–20	1 point
	21–30	2 points
	31 or more	3 points
2. On the days that you smoke, how soon after you wake up do you have your first cigarette?	Within 5 minutes	3 points
	6–30 minutes	2 points
	31–60 minutes	1 point
	After 60 minutes	0 point
HSI index score: Nicotine dependence categorised in 3 ways	Low addiction	0–2 points
	Moderate addiction	3–4 points
	High addiction	5–6 points
Note: Ask how much the patient smokes. Ask what the patient has tried in previous quit attempts. Ask what the patient would like to try now. Ask whether the patient would like suggestions from you.		

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