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Investment Case for Tobacco Control in SERBIA

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The case for scaling-up WHO FCTC implementation in Serbia

At least **19,800** Serbians die every year due to tobacco-related illness, accounting for nearly **20%** of all deaths in the country.

Tobacco-related illnesses cost Serbia

RSD 269 billion

every year, equivalent to

4.9% of annual GDP

Investing now in seven tobacco control measures will prevent at least

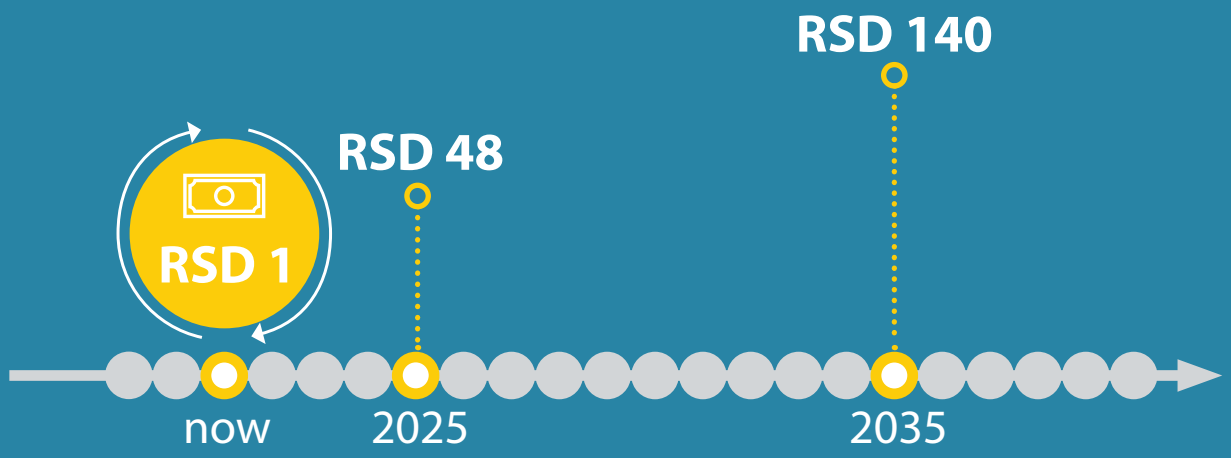
72,600 deaths

and avert

RSD 642 billion

in health costs and economic losses by 2035.

For every **Serbian dinar** invested in the seven key WHO FCTC policy actions today, Serbia will receive **RSD 48** in averted costs and economic losses by 2025 and **RSD 140** by 2035.



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This report was completed through collaborative efforts of the Ministry of Health of the Republic of Serbia, the Institute of Public Health of Serbia, the Institute of Economic Sciences, the United Nations Development Programme, the Secretariat of the WHO Framework Convention on Tobacco Control, and the World Health Organization (WHO).

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This tobacco control investment case highlights the enormous costs of tobacco in Serbia and the set of recommended policy actions that will deliver substantial economic and public health benefits to the country. The implementation of effective tobacco control policies from the WHO Framework Convention on Tobacco Control can play an important role in strengthening sustainable development in Serbia.

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Executive summary

Overview

Tobacco is a health and sustainable development issue. Tobacco causes death and disease, has a negative environmental impact, results in high health costs and economic losses, widens socioeconomic inequalities, and impedes progress across the Sustainable Development Goals.

This report presents the findings of the case for investing in tobacco control in Serbia, a stated priority of the Government of Serbia. In line with the WHO Framework Convention on Tobacco Control (WHO FCTC) Global Strategy to Accelerate Tobacco Control, it measures the costs and benefits—in health and economic terms—of implementing seven priority tobacco control measures. The seven measures are 1) increase tobacco taxation to reduce the affordability of tobacco products (WHO FCTC Article 6); 2) create smokefree public and work places to protect people from the harms of tobacco smoke (WHO FCTC Article 8); 3) expand rotating, graphic warning labels on tobacco packaging (WHO FCTC Article 11); 4) implement plain packaging of tobacco products (WHO FCTC Guidelines for implementation of Article 11 and WHO FCTC Guidelines for implementation of Article 13); 5) enact and enforce a comprehensive ban on all forms of tobacco advertising, promotion, and sponsorship (WHO FCTC Article 13); 6) raise public awareness of tobacco control issues (WHO FCTC Article 12); and 7) promote cessation of tobacco use and treatment for tobacco dependence by training health professionals to provide brief advice to quit tobacco use (WHO FCTC Article 14).

Main findings

In 2019, tobacco use caused RSD 269 billion in economic losses. These losses are equivalent to 4.9 percent of Serbia's GDP in 2019. They include a) RSD 33 billion in healthcare expenditures and b) RSD 236 billion in *indirect* losses due to tobacco-attributable premature mortality and disability as well as workplace smoking breaks. The *indirect* economic losses from current tobacco use in Serbia – 88 percent of all tobacco-related costs – indicate that tobacco use impedes development in Serbia beyond health; multisectoral engagement is required for effective tobacco control, and other sectors benefit substantially from supporting tobacco control investments through a healthier and more productive labor force.

By acting now, the Government of Serbia can reduce the national burden from tobacco use. The investment case findings demonstrate that enacting and enforcing seven proven WHO FCTC tobacco control measures will, over the next 15 years:

Avert RSD 642 billion in economic losses. Of this total, RSD 563 billion is attributable to indirect losses due to tobacco-attributable mortality and death. The tobacco control measures stimulate economic growth by ensuring that fewer people 1) die due to tobacco-attributable diseases, 2) miss days of work due to disability or sickness, and 3) work at a reduced capacity due to smoking breaks or tobacco-related health issues.

Lead to RSD 79 billion in savings through avoidance of tobacco-attributable healthcare expenditures. Of this, the government would save RSD 48 billion in healthcare expenditures, citizens would save RSD 30 billion in out-of-pocket healthcare costs, and RSD 1.3 billion would be saved from other sources of healthcare expenditures.

Save 72,600 lives and reduce the incidence of disease. The recommended WHO FCTC measures would contribute to Serbia's efforts to achieve SDG Target 3.4 to reduce by one-third premature mortality (under age 70) from non-communicable diseases (NCDs) by 2030. Enacting the WHO FCTC measures would prevent at least 16,900 premature deaths from the four main NCDs—cardiovascular disease (CVD), diabetes, cancer, and chronic respiratory disease—by 2030, the equivalent of about 22 percent of the needed reduction in premature mortality to achieve SDG Target 3.4.

Provide economic benefits (RSD 642 billion) that significantly outweigh the costs of implementing the 7 WHO FCTC measures (RSD 4.6 billion). Expanding and enforcing bans on tobacco advertising, promotion, and sponsorship has the highest return on investment (1,237:1), followed by implementing graphic health warning labels (987:1), increasing cigarette taxes (975:1), expanding and enforcing bans on smoking in public places (630:1), implementing plain packaging of tobacco products (335:1), public awareness of tobacco control issues (92:1), and cessation by training health professionals to provide brief advice to quit smoking (4:1).

In addition to the above analyses, the investment case separately examined the revenue-generating potential of cigarette tax increases (WHO FCTC Article 6). Under the examined scenario, committing to specific cigarette **excise tax increases over the next five years could generate RSD 165 billion**[1] **in revenue.** This is RSD 33 billion annually, equivalent to about 12 percent of government healthcare expenditures.

1 Undiscounted value.

Increasing cigarette taxes in Serbia will confer social and economic benefits to all, but particularly the poor. Those with lower incomes are more likely to quit smoking when cigarette prices are sufficiently increased, helping them to avoid illness and catastrophic healthcare expenditures. During the first year of the modeled tax increase, over two-thirds (71 percent) of the deaths averted from increasing cigarette taxes would be among the poorest 40 percent of the population. Cigarette tax increases would further benefit the poor if the resulting government tax revenue were reinvested into national development priorities such as universal health coverage including tobacco cessation support, in the context of an equitable COVID-19 response and recovery.

Recommendations

1. **Strengthen tobacco control governance by developing and adopting a new national multisectoral tobacco control strategy and by improving multisectoral collaboration.**
2. **Reduce affordability of tobacco products by raising excise taxes on tobacco and by regularly adjusting the tax rate to keep pace with the growth of incomes and/or inflation.**
3. **Commit to fully implement the WHO FCTC and take immediate action to strengthen the other six key WHO FCTC policy actions modeled in this investment case.**
4. **Take strong policy measures to counter tobacco industry interference.**

Table ES1. Summary of the main results of the investment case for tobacco control in Serbia*

Every year, tobacco use causes…	Over 15 years, implementing new tobacco control measures or intensifying existing ones would…
At least 19,800 deaths	Prevent at least 72,600 deaths
RSD 33 billion in healthcare expenditures	Save RSD 79 billion in healthcare expenditures
RSD 236 billion in indirect economic productivity losses	Prevent RSD 563 billion in economic losses
Economic losses equivalent to 4.9% of GDP	Generate economic benefits (RSD 642 billion) that greatly outweigh the cost (RSD 4.6 billion) of implementation and enforcement – a 140:1 return on investment

*Figures are subject to rounding.

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1. Introduction

Tobacco is one of the world's leading health threats, and a main risk factor for non-communicable diseases (NCDs) including cancers, diabetes, chronic respiratory disease, and cardiovascular disease. In Serbia, 38 percent of the adult population currently use some form of tobacco product [1], [2] leading to an estimated 19,872 deaths every year [3], [4].

Alongside the cost to health, tobacco imposes a substantial economic burden. A 2018 study (based on 2012 data) found that the costs of smoking[2] were equivalent to 1.8 percent of the world's annual gross domestic product (GDP). Almost 40 percent of the costs occurred in developing countries, highlighting the substantial burden these countries suffer [5]. Further, tobacco use can reduce productivity by permanently or temporarily removing individuals from the labor market due to poor health [6]. When individuals die prematurely, the labor output that they would have produced in their remaining years is lost. In addition, individuals with poor health are more likely to miss days of work (absenteeism) or to work at a reduced capacity while at work (presenteeism) [7], [8].

Tobacco use may displace household expenditure that would otherwise go to fulfilling basic needs, including food and education [9]–[11], and it contributes to hunger and impoverishment among families [12], [13]. It imposes health and socio-economic challenges on the poor, women, youth and other vulnerable populations [14].

Tobacco production causes environmental damage including soil degradation, water pollution and deforestation [15]–[17]. Given the far-reaching development impacts of tobacco, and the multisectoral nature of the interventions required, effective tobacco control requires the engagement of non-health sectors within the context of a whole-of-government and whole-of-society approach.

Current tobacco use trends in Serbia and around the world are incompatible with sustainable development. Through Sustainable Development Goal (SDG) Target 3.4, the Agenda 2030 for Sustainable Development commits Member States to achieve a one-third reduction in premature mortality from NCDs (i.e. deaths between 30 and 70) by 2030. Accelerating progress on NCDs requires strengthened implementation of the World Health Organization Framework Convention on Tobacco Control (WHO FCTC; SDG Target 3.a). Tobacco control is not just a primary means to improve population health, but also a proven approach to reduce poverty and inequalities,

2 Defined as either 'direct costs' such as hospital fees or 'indirect costs' representing the productivity loss from morbidity and mortality. This figure here represents these combined costs.

grow the economy and advance sustainable development. It is also an SDG accelerator as it can contribute to many goals simultaneously across the economic, social, and environmental spheres. However, more work must be done to reverse the tobacco epidemic including by accelerating implementation of the WHO FCTC.

Serbia ratified the WHO FCTC on February 8, 2006 [18]. Since then, it has enacted many WHO provisions including through the 2010 Law on the Protection of the Population from Exposure to Tobacco Smoke and the 2016 Law on Advertising [19]. However, there are opportunities for Serbia to intensify existing measures and implement new ones to reduce tobacco use prevalence and generate health and economic benefits. For example, there is room to expand bans on smoking in public spaces by removing designated smoking areas, and by increasing enforcement; health warning labels do not require graphic images and have size requirements smaller than those obligated under the WHO FCTC; and advertising bans can be expanded to include point-of-sale and all types of indirect advertising. Realizing the full benefits of such measures depends on concerted and coordinated efforts from multiple sectors of Government, as well as high-level leadership and an informed public.

In 2020, the Secretariat of the WHO FCTC, UNDP and WHO undertook a virtual joint mission with partners in Serbia to initiate an investment case as part of the FCTC 2030 Project. The FCTC 2030 Project is a global initiative funded by the Governments of the United Kingdom, Norway and Australia to support countries to strengthen WHO FCTC implementation to achieve the SDGs. As of 2022, Serbia is one of 33 countries worldwide that have participated in the FCTC2030 project

An investment case analyzes the health and economic costs of tobacco use as well as the potential gains from scaled-up implementation of WHO FCTC measures. It identifies which WHO FCTC demand-reduction measures will produce the largest health and economic returns for Serbia (the return on investment; ROI). In consultation with the Government of Serbia, the investment case models the impact of implementing the following seven key WHO FCTC provisions:

1. **Increase tobacco taxation to reduce the affordability of tobacco products.** *(WHO FCTC Article 6)*
2. **Create smokefree public and work places to protect people from the harms of tobacco smoke.** *(WHO FCTC Article 8)*
3. **Expand rotating, graphic warning labels on tobacco packaging.** *(WHO FCTC Article 11)*
4. **Implement plain packaging[3] of tobacco products.** *(WHO FCTC Guidelines for implementation of Article 11 and WHO FCTC Guidelines for implementation of Article 13)*
5. **Promote and strengthen public awareness of tobacco control issues, including the health risks of tobacco use and tobacco smoke, addiction, and the benefits of cessation.** *(WHO FCTC Article 12)*
6. **Enact and enforce a comprehensive ban on all forms of tobacco advertising, promotion, and sponsorship.** *(WHO FCTC Article 13)*
7. **Promote cessation of tobacco use and treatment for tobacco dependence by training health professionals to provide brief advice to quit tobacco use**. *(WHO FCTC Article 14)*

Chapter 3 of this report provides an overview of tobacco control in Serbia, including tobacco use prevalence as well as challenges and opportunities. **Chapter 4** summarizes the methodology of the investment case (for more detail see **Chapter 8**: Methodology Annex, and the separate Technical Appendix [available upon request]). **Chapters 5 and 6** report the main findings of the economic analysis. The report concludes under **Chapter 7** with recommendations. The annex provides information on the methods underlying the various analyses described in the report.

3 Plain (or standardized) packaging is defined as "measures to restrict or prohibit the use of logos, colours, brand images or promotional information on packaging other than brand names and product names displayed in a standard colour and font style". Further information is available at: Guidelines for implementation of Article 11 of the WHO Framework Convention on Tobacco Control (decision FCTC/COP3(10)) November 2008, available at: https://fctc.who.int/publications/m/item/packaging-and-labelling-of-tobacco-products

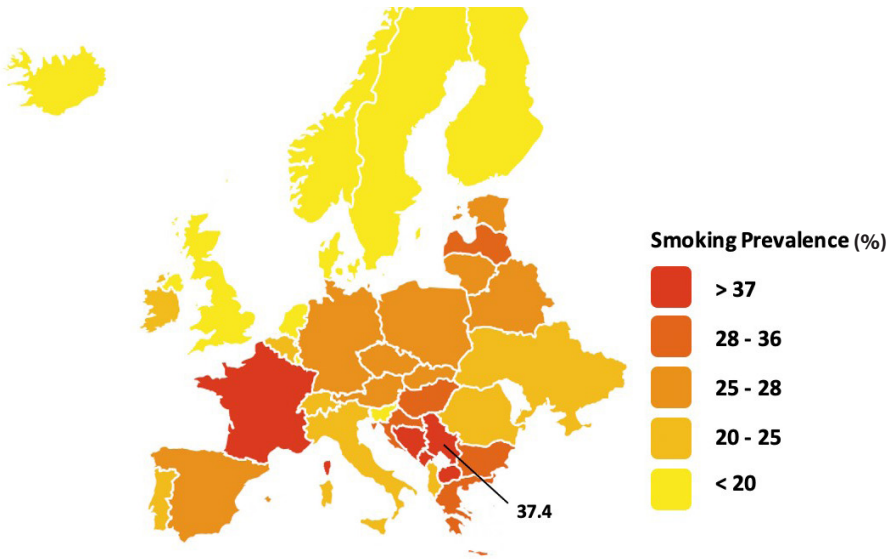
2. Tobacco control in Serbia: status and context

2.1 Tobacco use prevalence, social norms and awareness-raising

In Serbia, 37 percent of adults are current smokers, with a similar prevalence observed between men and women (39 percent and 36 percent, respectively) [1], [2]. While slightly lower than neighboring countries Montenegro (41 percent), Bosnia and Herzegovina (41 percent), and North Macedonia (48 percent), smoking prevalence in Serbia still ranks among the highest in Europe (**Figure 1**) [1], [20]. Most smokers consume manufactured cigarettes, with only about one in ten smokers consuming only hand-rolled cigarettes [1]. For consumers of hand-rolled cigarettes, almost all (99 percent) do so because of their relatively lower price [1]. On average, Serbians smoke 16.6 cigarettes per day (18.8 among men and 14.4 among women) and over three-quarters of Serbian daily smokers (77 percent) began smoking before the age of 24 [1]. In addition to cigarettes, 0.2 percent of Serbian adults currently use e-cigarettes and 0.7 percent consume heated tobacco products [1].

The 2017 Global Youth Tobacco Survey (GYTS) found that 16.2 percent of 13-15 year-old students in Serbia use some form of tobacco with 15.3 percent being current tobacco smokers [22]. Despite existing sales restrictions, more than 70 percent of student-smokers were able to purchase cigarettes at stores, shops, street vendors, or kiosks [22].

Fig. 1: Current adult cigarette smoking prevalence in Europe *(Data in this figure is from WHO Report on the Global Tobacco Epidemic, 2019)*



Smoking Prevalance, (%)

North Macedonia, 48
Bosnia and Herzegovinia, 41
Montenegro, 41
Serbia, 37
Bulgaria, 36
Latvia, 33
France, 31
Cyprus, 30
Hungary, 29
Turkey, 28
Spain, 26
Portugal, 25
Kazakhstan, 23
Israel, 22
Netherlands, 20
Finland, 17.7
Azerbaijan, 15.9
Norway, 15.4
Sweden, 12.9

Secondhand smoke (SHS) exposure is also a serious challenge in Serbia. Sixty-nine percent of adults currently live in homes where smoking is allowed in at least one room [1]. More than four in five households with children age 14 and under allow smoking inside the home [21]. According to the 2017 Serbia GYTS, about 3 in 5 students aged 13-15 years old were exposed to SHS at home and in enclosed public spaces [22].

Smoking is costly for Serbian households, which on average spend nearly 13 percent of disposable monthly income on manufactured cigarettes [1]. Cigarette prices and health problems are the two most frequently cited reasons among those who have made a quit attempt in the last year [1]. However, only 9.5 percent of current smokers attempted to quit in the past year and a vast majority (93 percent) made their quit attempt without any assistance [1]. The majority of smokers (80 percent) report that they did not change their smoking habits in reaction to a recent four percent increase in price generated by tax increases[4] [1]; however, price increases were ameliorated to an extent by gains in income meaning that even though the price of cigarettes increased they likely did not become less affordable, which is important for reducing consumption.

2.2 The status of WHO FCTC tobacco control demand-reduction measures

Strong fiscal and regulatory measures influence societal norms by signaling that tobacco use is harmful, not only for users but also for the people around them—including family, colleagues, and workers. While Serbia has implemented some tobacco control measures, tobacco continues to harm health and the economy, with more than 6,000 children (10-14 years old) and 2.2 million adults (15+ years old) continuing to use tobacco products [21], [23].

The 2005 Law on Tobacco, which has been amended several times since passage, established the framework for tobacco control in Serbia, regulated the sale of tobacco products, and introduced health warnings on cigarette packaging [24]. Subsequent laws such as the Law on the Protection of the Population from Exposure to Tobacco Smoke (2010) and the Law on Advertising (2016) regulated smoking in public spaces, as well as the advertising, promotion, and sponsorship of tobacco products [24], [25].

Implementing additional measures—and strengthening existing ones—can draw Serbia into further alignment with the WHO FCTC and reduce the substantial costs imposed by tobacco use. Serbian adults express support for some additional tobacco control measures; in spite of recent survey results indicating non-responsiveness to price increases [1], nearly half of adults believe that either raising tobacco prices or expanding smoking bans would be a "useful" tobacco control strategy [21]. This section summarizes the current state of WHO FCTC demand-reduction measures and the target level advocated for and analyzed within the investment case.

4 In July 2019, the Government of Serbia raised the specific excise price from RSD 70.70 to 72.22, raising the price of cigarettes by an estimated four percent (from RSD 256 to 261 – authors' calculations).

Increase tobacco taxation to reduce the affordability of tobacco products (WHO FCTC Article 6)

Currently in Serbia, taxes account for 77.3 percent of the retail price of the most sold cigarette brand, of which 27.7 percent specific excise tax, 33 percent is ad valorem excise tax and 16.7 percent is value added tax [26], [27][5], thus excise taxes represent 60.7 percent of the retail price.

Under current plans specified under the amendment to the Law on Excise Duties, specific excise taxes will continue to gradually increase from the current specific excise tax of RSD 75 per pack to RSD 90 in 2025. These increases are not expected to outpace rising Serbian incomes, meaning that even as cigarettes become slightly more expensive, they are not becoming less affordable for the population. A critical component of WHO tobacco tax guidance is that rates should be sufficiently high to reduce consumption and should therefore be increased on a regular basis to encompass inflation and income growth.

According to the WHO technical manual on tobacco tax policy and administration, uniform specific excise taxes or mixed tax structures that rely on specific excise taxes are the most likely to lead to higher prices [28]. Similarly, according to the WHO FCTC Guidelines for implementation of Article 6, Parties to the Convention should consider specific or mixed excise tax systems, these guidelines also recommend a minimum specific tax floor [29].

The investment case analysis examines an alternative scenario in which Serbia chooses to enact strong cigarette tax increases that not only outpace rising incomes but also fulfill European Union (EU) Directive 2011/64/EU, supporting Serbia's EU candidacy.[6] In the hypothetical scenario modeled in this investment case, ad valorem and VAT tax rates stay the same, while the specific excise tax rises (in real terms) from RSD 75 in 2020 to RSD 170 in 2025, with continued and more gradual increases averaging RSD 19 through 2035 (see appendix for detailed information).

5 Own calculations. 2020 estimates based on reported levels in 2019 (Zubović, 2020) and planned tax increases through mid-2020 *(Zubović, 2019).

6 Directive 2011/64/EU requires that member countries' overall excise tax rate must be 1) at least 90 Euros per 1,000 cigarettes and 2) at least 60 percent of the weighted average retail selling price. European Commission Taxation and Customs Union [30]. Currently, Serbia's excise taxes are about 72 Euros per 1,000 cigarettes.

Enacting and enforcing comprehensive smokefree measures for all indoor public and work places (WHO FCTC Article 8)

Serbia's Ban on Smoking in Enclosed Places (2010) prohibits smoking in some public places, including educational, healthcare, performance, and public broadcasting facilities, as well as public transportation and elevators. However, surveys indicate compliance with the bans is insufficient [31]. Designated smoking areas are permitted in restaurants, bars and cafes, signaling the acceptability of smoking as a social norm [24]. While there are funds for the enforcement of smokefree policies, no system is in place to field and investigate complaints [18]. The investment case examines the impact of enacting and enforcing comprehensive smokefree measures for all indoor public and work places.

Require tobacco packaging to carry graphic health warnings describing the harms of tobacco use (WHO FCTC Article 11)

Serbia mandates that 35 percent of the principal display areas (front and back combined) on tobacco product packaging be covered by a textual health warning, and mandates that health warnings rotate [18]. However, graphic (photographic) warnings are not required, despite their demonstrated ability to prompt smokers to quit. Health warnings on packages are not required to be unobscured, including by tax stamps and other required warnings [18]. The investment case examines the impact of mandating that at least 50 percent of the principal display area of all tobacco packages are covered with graphic warning labels that are rotated on a regular basis.

Implement plain packaging of tobacco products (WHO FCTC Guidelines for implementation of Article 11 and WHO FCTC Guidelines for implementation of Article 13)

Serbia currently does not require plain packaging of tobacco products. The investment case models the impact of implementing and enforcing plain packaging requirements.

Promote and strengthen public awareness of tobacco control issues, including the health risks of tobacco use and tobacco smoke, addiction, and the benefits of cessation (WHO FCTC Article 12)

Serbia has not recently implemented an anti-tobacco national mass-media campaign. Lack of awareness of tobacco-related health harms and social acceptance has hindered efforts to enforce tobacco control laws and to scale up other tobacco control interventions [32], [33]. Launching a best-practice mass media campaign (examined in the investment case) would further promote and strengthen public awareness about tobacco control issues and the harms of tobacco use. The investment case examines the impact of implementing mass media campaigns against tobacco use.

Enact and enforce a comprehensive ban on all forms of tobacco advertising sponsorship and promotion (WHO FCTC Article 13)

Serbia bans direct tobacco advertising through national and international TV and radio, print magazines and newspapers, and billboards and outdoor advertising, with a high degree of compliance [18]. While sponsorships and some forms of indirect advertising are banned, other types of indirect advertising such as the appearance of tobacco products in TV and films, point-of-sale advertising, and corporate social responsibility (CSR) activities remain unregulated. Additionally, there is poor compliance with existing indirect advertising bans [18]. The investment case models the impact of implementing a comprehensive ban on tobacco advertising, promotion, and sponsorship (TAPS).

Promote cessation of tobacco use and treatment for tobacco dependence (WHO FCTC Article 14)

Smoking cessation support is available in some healthcare facilities, including primary care facilities, hospitals, and healthcare offices, but is not available in community centers. Supportive cessation advice from trained providers can motivate individuals to quit or increase quit attempts. The investment case examines the impact of training half of Serbia's primary care workforce to offer cessation advice in primary care settings (see methodology annex for detailed information).

Table 1 summarizes the existing state of WHO FCTC demand-reduction measures and compares them against a target that would represent a high level of implementation. The impact of each policy measure—individually and in combination—is described in *Annex Table A3*.

Table 1. Summary of the current state of WHO FCTC demand-reduction measures in Serbia and target goals

Tobacco Control Policy	Serbia Baseline*	Modeled Implementation Target
Increase tobacco taxation to reduce the affordability of tobacco products *(WHO FCTC Article 6)*	Tax share equivalent to 77.3 percent of the retail price of the most sold cigarette brand. The excise tax share is 60.7 percent of the retail price, with 26.7 percent attributed to the specific excise tax. Excise taxes equal to about 72 Euros per 1,000 cigarettes.	Increase taxes on cigarettes to outpace rising incomes and fulfill the EU Directive 2011/64/EU so that the overall excise tax rate is at minimum 90 euros per 1,000 cigarettes and at least 60 percent of the weighted average retail selling price [28].[7]
Create smokefree public and work places to protect people from the harms of tobacco smoke *(WHO FCTC Article 8)*	Smoking is regulated in some public places. Enclosed public places, workplaces and public transport are smokefree. However, designated smoking areas are allowed in restaurants, bars and cafes.	Remove provision for designated smoking areas to make all indoor work and public places 100 percent smoke free.
Require graphic health warnings on tobacco product packaging that describes the harms of tobacco use *(WHO FCTC Article 11)*	Textual health warnings are required to cover at least 35 percent of cigarette packages.	Mandate that health warning labels cover at least 50 percent of the principal display areas of tobacco packaging and that labels contain graphic images.
Implement plain packaging of tobacco products *(WHO FCTC Guidelines for implementation of Article 11 and WHO FCTC Guidelines for implementation of Article 13)*	Plain packaging is currently not mandated.	Implement and enforce plain packaging of tobacco products.
Promote and strengthen public awareness of tobacco control issues, including the health risks of tobacco use and tobacco smoke, addiction, and the benefits of cessation *(WHO FCTC Article 12)*	No national-level, anti-smoking media campaigns reflecting WHO best practices have recently aired in Serbia.	Implement periodic nationwide anti-smoking mass media campaigns that are researched and tested with a targeted audience and evaluated for impact.
Enact and enforce a comprehensive ban on all forms of tobacco advertising, promotion, and sponsorship - TAPS *(WHO FCTC Article 13)*	Most forms of domestic and international advertising are banned (e.g. TV, radio, billboards, print). However, many forms of tobacco promotion and sponsorship are not regulated.	Enact and enforce comprehensive smokefree requirements for indoor public and work places.
Promote cessation of tobacco use and treatment for tobacco dependence: Offer brief advice to quit at the primary care level *(WHO FCTC Article 14)*	Smoking cessation support is available in some healthcare facilities and hospitals.	Expand training of primary care health providers to identify tobacco users and to provide tobacco cessation advice; scale up the provision of tobacco cessation services at the primary care level.

** Information in this column is drawn from the WHO Report on the Global Tobacco Epidemic, 2019: Serbia country profile [17].*

7 All modeled targets are reflective of WHO FCTC obligations, except for tax targets. Serbia is already meeting—or nearly meeting—WHO FCTC obligations and WHO recommendations.

2.3 Tobacco use and the COVID-19 pandemic

The global COVID-19 pandemic has strained health systems worldwide, and the economic impact of the outbreak has been immense. People living with pre-existing NCDs, including those caused by tobacco use, are more vulnerable to becoming severely ill with COVID-19 [34]. According to WHO, smokers have up to a 50 percent increased risk of developing severe disease or dying from COVID-19 [35]. However, more research needs to be conducted. Well-designed population-based studies are necessary to address questions about hospitalization, COVID-19 severity and the risk of infection by SARS-CoV-2 among smokers.

2.4 National tobacco control legislation, strategy and coordination

Serbia's national tobacco control strategy was drafted to cover the period 2007-2015, but has not been updated since. It remains valid until a new strategy is adopted [36]. The guiding principles of the strategy are as follows:

- The right of every citizen to be informed on health risks related to smoking and exposure to environmental tobacco smoke;
- The right of every citizen to live and work in a tobacco-free environment;
- The right of every smoker to obtain advice and support for smoking cessation within the health care system;
- The responsibility of the government to protect the health of all its citizens and therefore to take whatever legislative, economic and administrative measures are necessary to reduce levels of tobacco use and exposure to second hand tobacco smoke;
- Political commitment to tobacco control is essential and is best achieved through comprehensive multisectoral action to ensure that smoking is considered undesirable behavior;
- The responsibility of the government to allocate sufficient funds to tobacco control activities to ensure continual reduction in levels of smoking and exposure to tobacco smoke throughout the population.

Among the immediate objectives set by the strategy was to implement and enforce legislation "in concordance with the WHO Framework Convention of Tobacco Control" [36]. The strategy covered all major areas of tobacco control, including measures to reduce demand for and supply of tobacco products. The Strategy was accompanied by an action plan; however, most deadlines in the plan expired in 2011 and no new action plans have been adopted since. It is an opportune time for Serbia to advance a new national multisectoral tobacco control strategy, with a focus on issues such as strengthening comprehensive legislation, stronger coordination, and prevention of tobacco industry interference in policymaking.

No national multisectoral coordination mechanism for tobacco control currently exists in Serbia, and there remains a need to strengthen engagement of the Prime Minister's Office, President and Ministry of Finance in particular. The previous national tobacco control strategy and current tobacco control legislation in Serbia, in particular the Law on the Protection of the Population from Exposure to Tobacco Smoke of 2010, define bodies and institutions responsible for the implementation and coordination of tobacco control measures. The Office for the Prevention of Smoking was established to implement activities such as research, data collection, coordination of smoking cessation and campaigns in cooperation with other partners and stakeholders. The Committee for Tobacco Control, advisory body of the MoH, aids the work of the Office. The previous national tobacco control strategy required that senior representatives of different ministries jointly supervise implementation of tobacco regulations in the country, a good practice, and similar provisions are in the Law on the Protection of the Population from Exposure to Tobacco Smoke of 2010, which mandates multisectoral collaboration through a composite inter-ministerial body responsible for supervising the enforcement of smoking bans [Articles 21-23].

The Office for the Prevention of Smoking has had limited resources. A 2019 Report of the Association of European Cancer Leagues found the 2018 tobacco control budget of Serbia, only EUR 0.003 per capita, to be among the lowest of the 36 European countries examined [37].

2.5 Tobacco industry presence and interference in policy making

The tobacco industry attempts to interfere with public decision-making around tobacco control at all levels, and there is a need to raise political awareness and capacity in Serbia to eliminate this in line with WHO FCTC Article 5.3. Serbia is one of the largest regional hubs for cigarette manufacturing, producing around 38 billion cigarettes in 2017 [27]. High smoking prevalence makes Serbia an important market for tobacco products. The major tobacco industry actors in Serbia are Philip Morris, Japan Tobacco International, and British American Tobacco. Despite being competitors, these companies have worked jointly to make the domestic regulatory environment for tobacco more favorable.

In 2012–2014, in response to an increase in excise taxes, the tobacco industry manipulated the prices of tobacco products to increase the final retail price to more than expected, causing a stronger than expected reduction in sales and leading to a drop in excise tax revenues, while also managing to grow its profits (as a result of a disproportionate increase in profit margins from the price spike) [37]. The industry then used the resulting drop in excise revenues as an argument against any future steep augmentation of excise taxes, persuading the policymakers to adopt a tobacco excise tax policy that proposes only moderate excise tax increases which have been largely negated or even outpaced by household income growth [39]. Global evidence suggests that countries can tailor their tax system structure to reduce industry influence and mitigate

attempts to undermine tax increases. Uniform specific excise taxes or mixed systems weighted toward specific excise taxes are demonstrated to lead to higher prices, and in general are less manipulable [39].

The tobacco industry is also known to have commissioned studies to substantiate its claims that increasing tobacco taxes leads to growth of illicit tobacco trade, whereas international evidence suggests that the share of illicit trade in the total tobacco trade usually increases because the overall tobacco market shrinks and not because the volume of illicit tobacco sales spikes [38]. The tobacco industry has further alluded to job creation and income generation effects that result from its activity in the country to argue against stricter tobacco control policies [38]. However, national statistics indicate that domestic employment in the tobacco industry has been declining over the past decades, dropping from nearly 0.2 percent of total employment in 2000 to 0.06 percent in 2017 [38].

3. Methodology

The purpose of the FCTC investment case is to quantify the current health and economic burden of tobacco use in Serbia (in the context of tobacco control measures that are currently in place), and to estimate the impact that implementing new tobacco control measures—or strengthening existing ones—would have on reducing this burden.

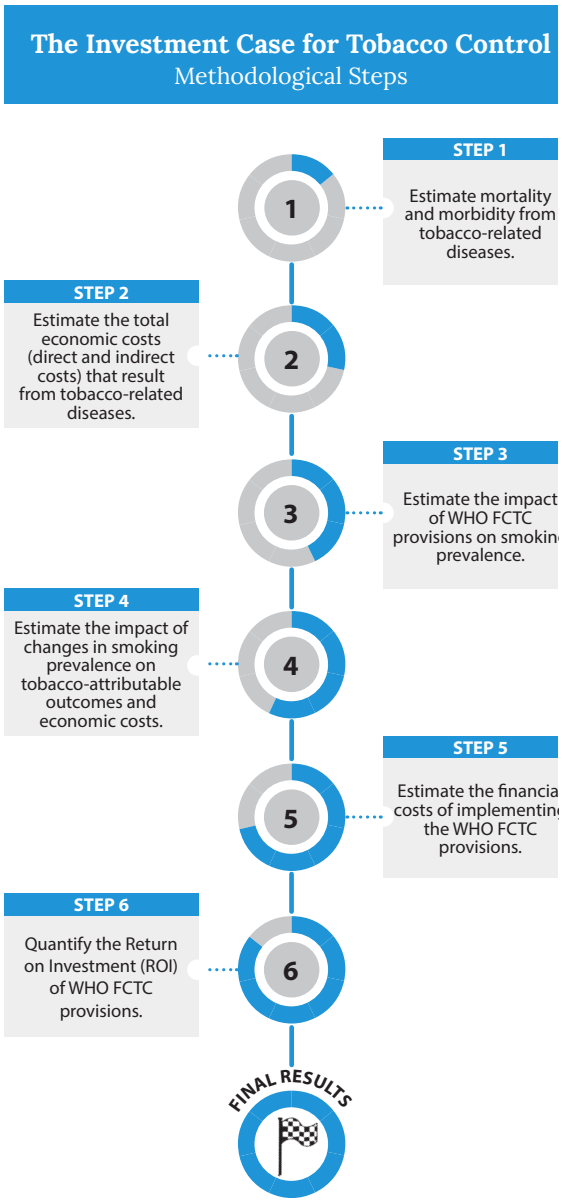
A static model was developed to conduct the investment case and to perform the methodological steps in **Figure 2**. This methodology has been used for previous national FCTC investment cases under the WHO FCTC 2030 project project.

The tools and methods used to perform these steps are described in this report's Annex. Interested readers are also referred to this report's separate *Technical Appendix*[8] for a more thorough account of the methodology.

The investment case team worked with stakeholders in Serbia to collect national data inputs for the model. Where data was unavailable from government or other in-country sources, the team utilized publicly available national, regional, and global data from sources such as the World Health Organization (WHO), the World Bank database, the Institute for Health Metrics and Evaluation's (IHME) Global Burden of Disease (GBD) study, and academic literature.

Within the investment case, costs and monetized benefits are reported in constant 2019 Serbian dinars (RSD) and discounted at an annual rate of 5 percent.

Fig. 2: Building the investment case



8 Available upon request.

4. Results

4.1 The current burden of tobacco use: health and economic costs[9]

Tobacco use undermines economic growth. In 2019, tobacco use caused an estimated 19,872 deaths in Serbia. These deaths amounted to 269,170 years of life lost, which are lost productive years in which many of those individuals would have contributed to the workforce. The economic losses in 2019 due to tobacco-related premature are estimated at RSD 171 billion.

While the costs of premature mortality are high, the consequences of tobacco use begin long before death. As individuals suffer from tobacco-attributable diseases (e.g., cardiovascular diseases, respiratory conditions, cancers), expensive medical care is required to treat them. Spending on medical treatment for illnesses caused by smoking cost the government RSD 20.0 billion in 2019 and caused Serbian citizens to spend RSD 12.8 billion in out-of-pocket (OOP) healthcare expenditures. Private insurance and non-profit institutions serving households spent RSD 0.6 billion on treating tobacco-attributable diseases in 2019. In total, healthcare expenditures attributable to smoking amounted to RSD 33 billion (**Figure 3**).

In addition to healthcare costs, as individuals become sick, they are more likely to miss days of work (absenteeism) or to be less productive at work (presenteeism). In 2019, the cost of excess absenteeism due to tobacco-related illness was RSD 11.5 billion and the cost of presenteeism due to cigarette smoking was RSD 31 billion.

Finally, even in their healthy years, workers who smoke are more likely to incur productivity loss than workers who do not smoke. Smokers take an estimated ten additional minutes per day in breaks than non-smoking employees [40]. If ten minutes of time is valued at the average worker's salary, the compounding impact of 1.1 million employed smokers in Serbia taking ten minutes per day for smoke breaks is equivalent to losing RSD 22 billion in productive output annually.

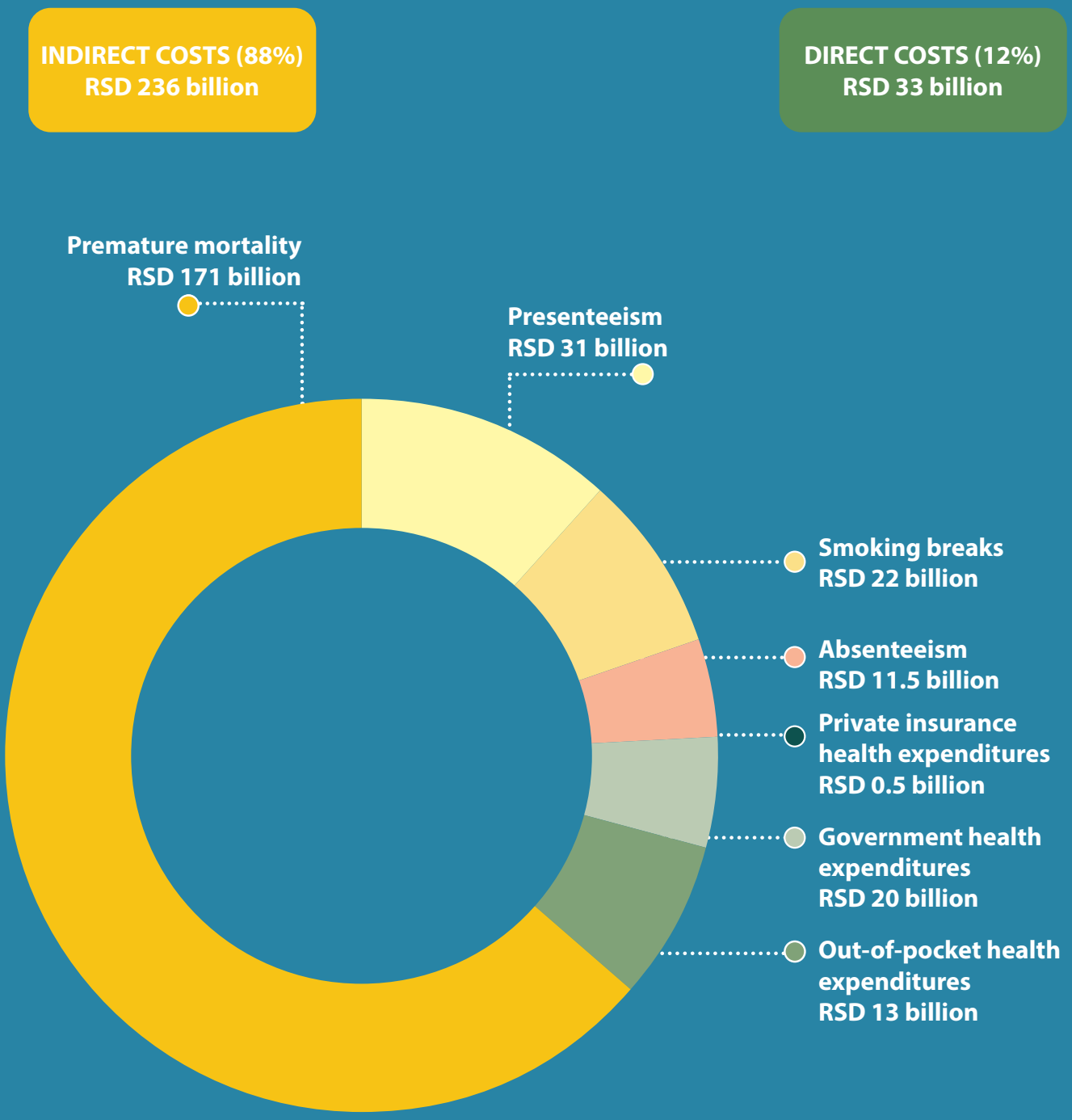
In total, tobacco use caused RSD 269 billion[10] in economic losses in 2019, equivalent to about 4.9 percent of Serbia's 2019 GDP. **Figure 3** breaks down direct and indirect costs. **Figure 4** and **Figure 5** illustrate the annual health losses that occur due to tobacco use.

9 In assessing the 'current burden' of tobacco use, the economic costs of premature mortality include the cost of premature deaths due to any form of exposure to tobacco (including of smoking, second-hand smoke, and the use of other types of tobacco products). Only smoking-attributable (not tobacco-attributable) costs are calculated for healthcare expenditures, absenteeism, presenteeism, and smoking breaks. While other forms of tobacco may also cause losses in these categories, no data is available to precisely ascertain those losses. .

10 Component parts may not add to RSD 269 billion exactly due to rounding.

The current burden of tobacco use

Fig. 3: Breakdown of the share of direct and indirect economic costs (RSD billions) in 2019*



*Figures are subject to rounding.

Fig. 4: Tobacco-attributable deaths by disease in Serbia, 2019 *(Source: Results are from the IHME Global Burden of Disease Results Tool. Other causes include bladder cancer, larynx cancer, aortic aneurysm, stomach cancer, leukemia, breast cancer, cervical cancer, liver cancer, peptic ulcer disease, lip and oral cavity cancer, esophageal cancer, other pharynx cancer, kidney cancer, prostate cancer, asthma, peripheral artery disease, atrial fibrillation and flutter, tuberculosis, multiple sclerosis, gallbladder and biliary diseases, nasopharynx cancer, rheumatoid arthritis, and otitis media.)*

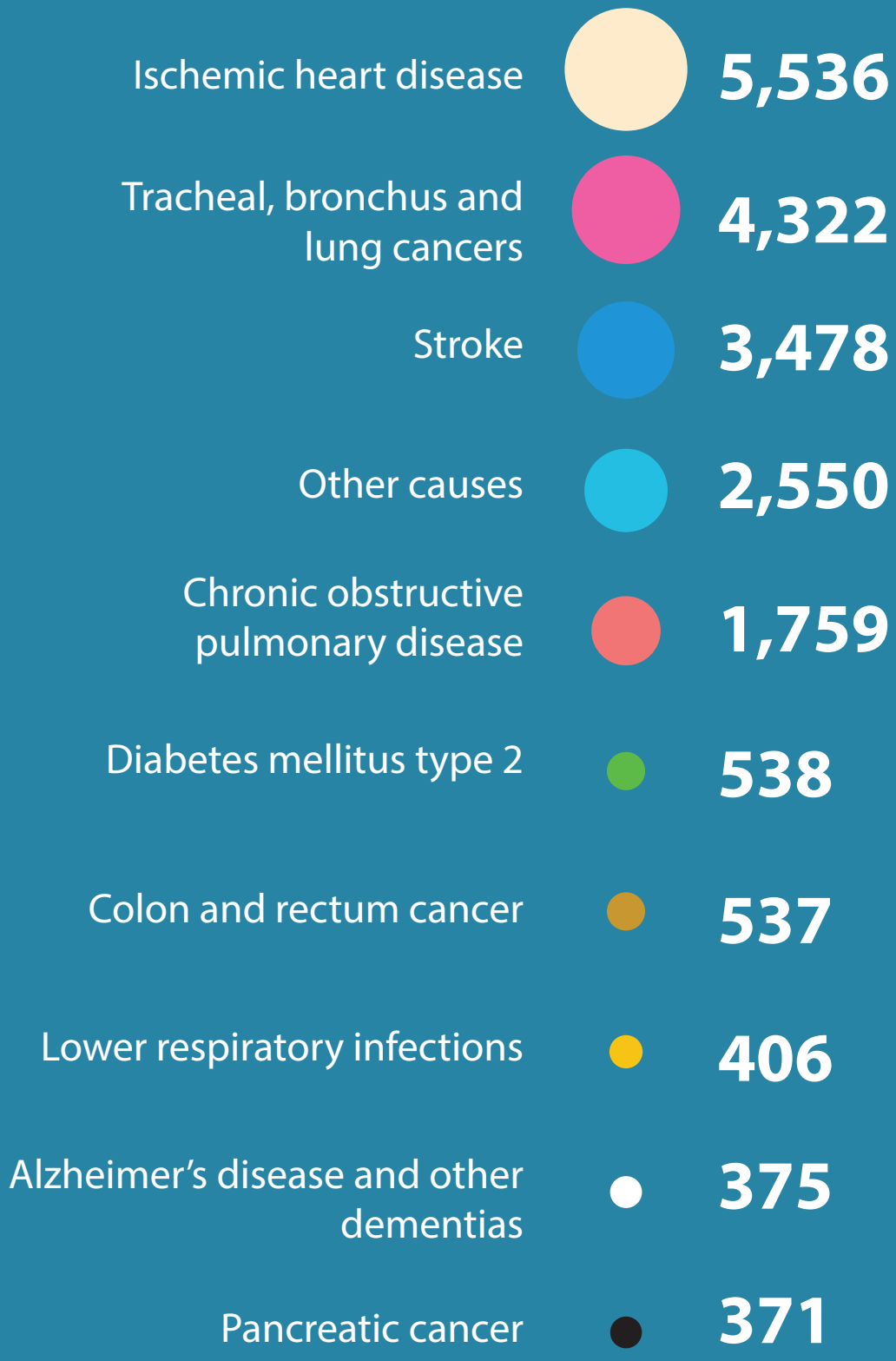
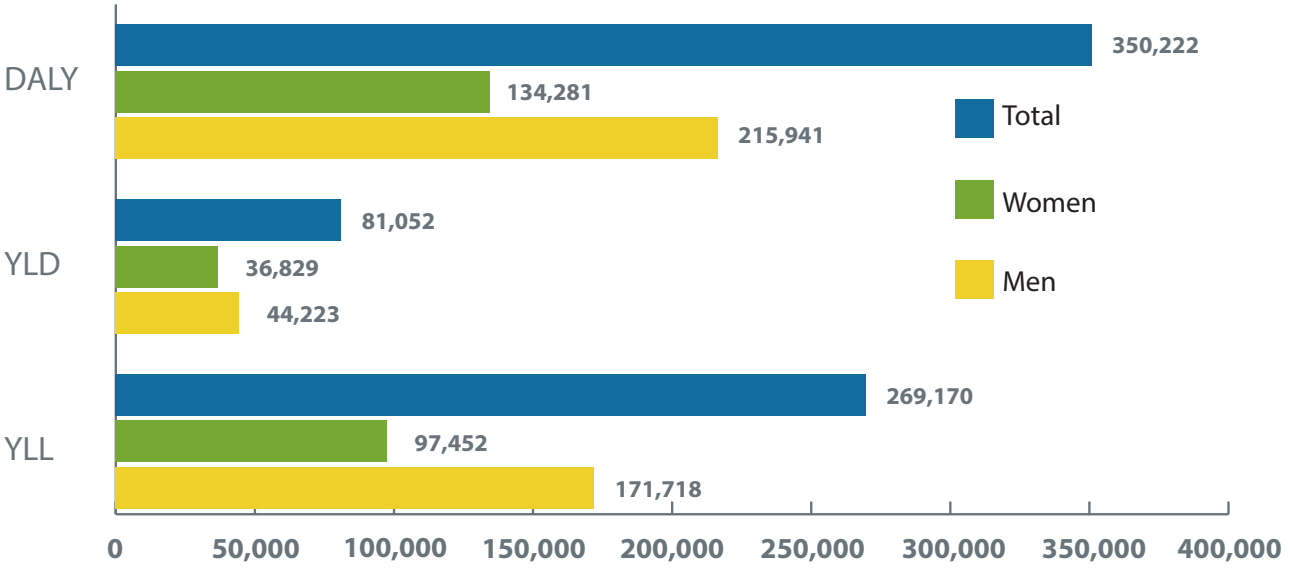


Fig. 5: Tobacco-attributable DALYs, YLDs, and YLLs in Serbia, by gender, 2019*



* A disability-adjusted life year (DALY) is a universal metric that allows comparison between different populations and health conditions across time. DALYs equal the sum of years of life lost (YLLs) and years lived with disability (YLDs). One DALY equals one lost year of healthy life. Years of life lost (YLL) are years lost due to premature mortality. Years lived with disability (YLD) can also be described as years lived in less-than-ideal health. A YLD is calculated by taking the prevalence of the condition multiplied by the disability weight for that condition [41].

4.2 Implementing policy measures that reduce the burden of tobacco use

Implementing new tobacco control measures—or strengthening existing ones—can reduce the national burden from tobacco use. Through these actions, Serbia can secure significant health and economic returns, and begin to reduce the RSD 269 billion in annual direct and indirect economic losses from tobacco use.

The next two subsections present the health and economic benefits that result from seven WHO FCTC policy actions to 1) increase tobacco taxation to reduce the affordability of tobacco products (WHO FCTC Article 6); 2) create smokefree public and work places to protect people from the harms of tobacco smoke (WHO FCTC Article 8); 3) implement plain packaging of tobacco products (WHO FCTC Guidelines for implementation of Article 11 and WHO FCTC Guidelines for implementation of Article 13); 4) enact and enforce a comprehensive ban on all forms of tobacco advertising, promotion, and sponsorship (WHO FCTC Article 13); 5) promote cessation of tobacco use and treatment for tobacco dependence by training health professionals to provide brief advice to quit tobacco use (WHO FCTC Article 14); 6) promote and strengthen public awareness of tobacco control issues (WHO FCTC Article 12); 7) require graphic health warnings on tobacco product packaging that describes the harms of tobacco use (WHO FCTC Article 11).

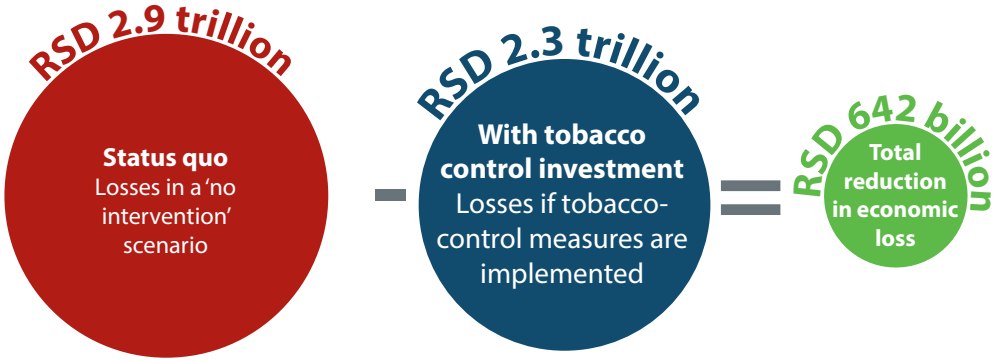
4.3 Health benefits – lives saved

The full implementation of the WHO FCTC in Serbia (inclusive of all seven of the measures listed above) would lower the prevalence of tobacco use, leading to substantial health gains now and into the future. Specifically, implementing the package of seven WHO FCTC policy actions that are the focus of this investment case would reduce the prevalence of cigarette smoking by 42 percent (in relative terms) over 15 years, saving 72,600 lives from 2021–2035, or 4,800 lives annually.

4.4 Economic benefits – costs averted

Implementing the tobacco control policy package would result in Serbia avoiding 22 percent of the economic losses it is expected to incur from tobacco use over the next 15 years. **Figure 6** illustrates the extent to which Serbia can shrink the economic losses it is expected to incur under the status quo.

Fig. 6: Tobacco-related economic losses over 15 years, 2021-2035



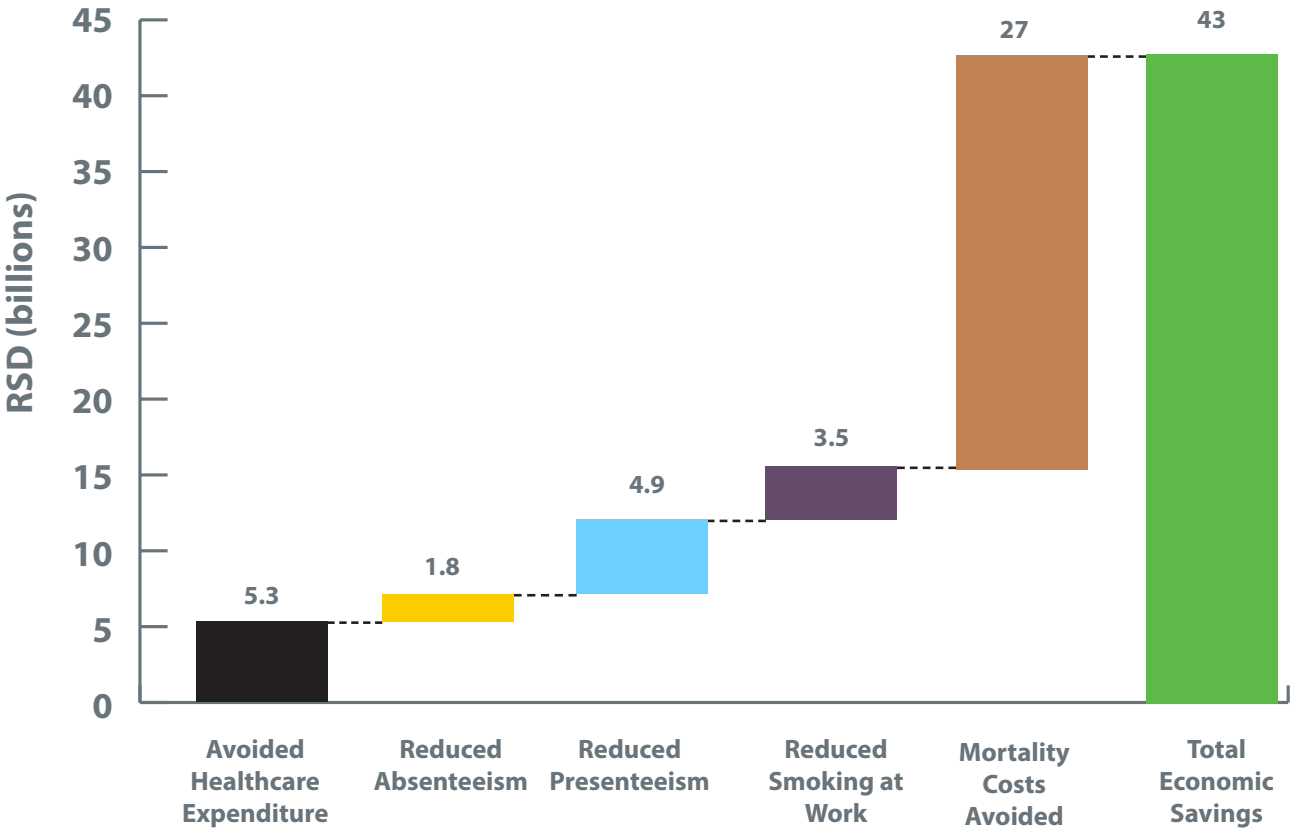
In total, over 15 years Serbia would save about RSD 642 billion that would otherwise be lost if the package of seven key WHO FCTC policy actions were not implemented. This is equivalent to around RSD 43 billion in annual avoided losses.

With better health that would arise from implementation of the WHO FCTC, fewer individuals would need access to healthcare services due to tobacco-related diseases, resulting in direct cost savings to the government and citizens. Better health also leads to increased productivity. Workers miss fewer days of work (absenteeism) and are less hindered by health complications while at work (presenteeism). Finally, because the prevalence of smoking declines, fewer smoke breaks are taken in the workplace.

Figure 7 breaks down the sources from which annual avoided costs accrue from implementation of the package of seven WHO FCTC policy actions. The largest annual avoided costs result from averted premature mortality (RSD 27 billion). The next highest source is avoided healthcare

expenditures (RSD 5.3 billion), followed by reduced presenteeism (RSD 4.9 billion), reduced numbers of smoking breaks (RSD 4.5 billion), and reduced absenteeism (RSD 1.8 billion).

Fig. 7: Sources of annual avoided economic costs because of implementing the tobacco control policy package*



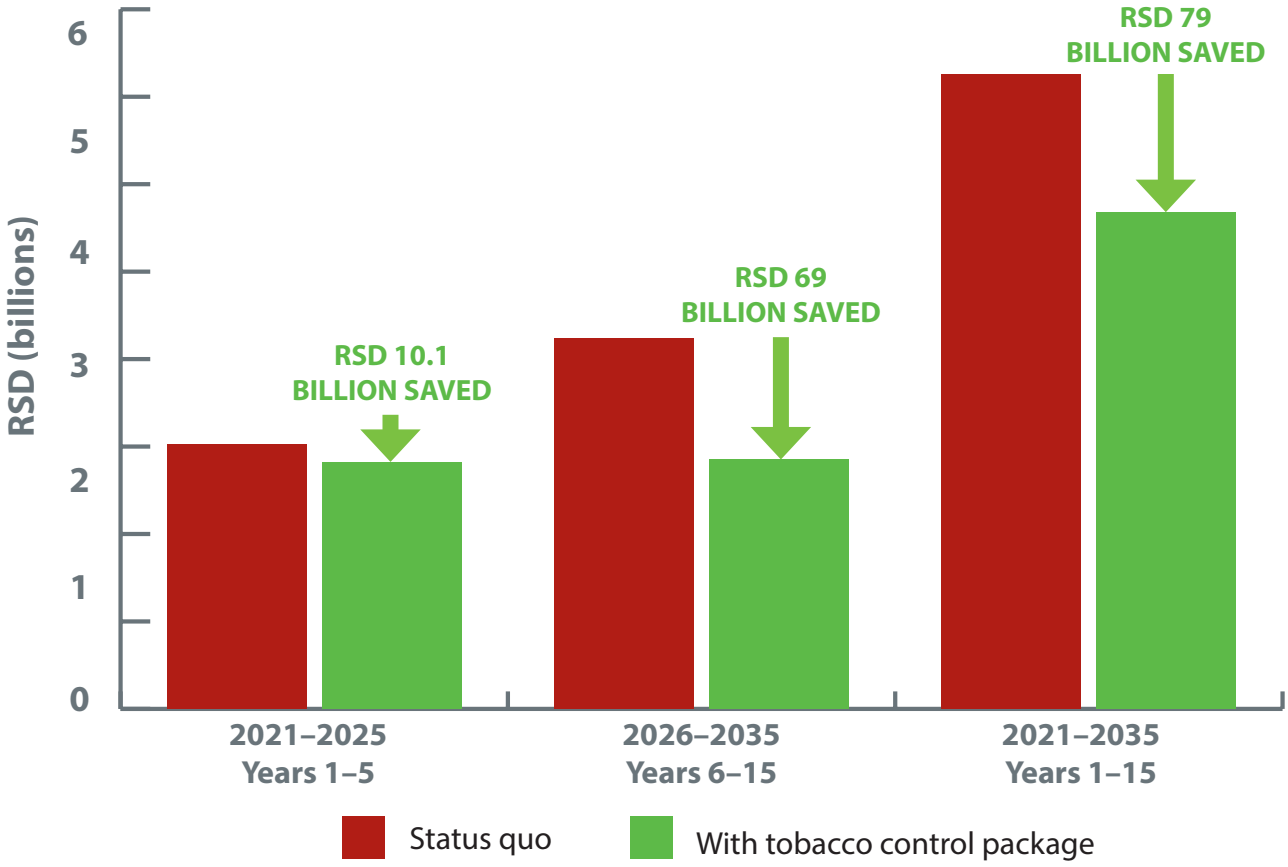
*Figures are subject to rounding.

Implementing the package of seven WHO FCTC policy actions examined in this investment case will reduce medical expenditures, both for citizens and the government. Presently, total private and public annual healthcare expenditure in Serbia is about RSD 433 billion [42], 7.7 percent of which is directly related to treating disease and illness due to tobacco use [5] (≈ RSD 33 billion).

Year-on-year, the package of interventions lowers tobacco use prevalence, which leads to less illness, and consequently less healthcare expenditure (see **Figure 8**). Over the 15-year time horizon of the analysis, the package of interventions averts RSD 79 billion in healthcare expenditures, or RSD 5.3 billion annually. Of this, 60 percent of savings accrue to the government and 38 percent accrue to individual citizens who would have had to make out-of-pocket payments for healthcare. The remainder of savings goes to private insurance and other sources of healthcare expenditures. Thus, from reduced healthcare costs alone, the government stands to save about RSD 48 billion over 15 years. Simultaneously, the government would successfully reduce the healthcare expenditure

burden that tobacco imposes on Serbia's citizens, supporting efforts to reduce economic hardship on families. Rather than spending on treating avoidable diseases and routinely spending on tobacco products, these families would be able to invest more in nutrition, education, and other productive inputs to secure a better future.

Fig. 8: Private and public healthcare costs (and savings) over the 15-year time horizon, 2021-2035*



*Figures subject to rounding.

4.5 The return on investment

An investment is considered worthwhile from an economic perspective if the gains from making it outweigh the costs. A return on investment (ROI) analysis measures the efficiency of the tobacco investments by dividing the economic benefits that are gained from implementing the WHO FCTC policy actions by the costs. For the Serbia investment case, the ROI for each intervention was evaluated in the short-term (period of five years), to align with planning and political cycles, and in the medium-term (period of 15 years) to align with and beyond the SDGs. The ROI shows the return on investment for each intervention and for the full package of WHO FCTC policy actions. Total benefits are a measure of which interventions are expected to have the largest impact.

Table 2 displays costs, benefits, and ROIs by intervention, as well as for all interventions combined. All seven interventions deliver a ROI of at least one within the first five years, meaning that even in the short-term the benefits of implementing the interventions meets or exceeds the costs. Depending on the intervention, over the first five years, the government will gain economic benefits ranging from 1 to 436 times its investment. The ROIs for each intervention continue to grow over time, reflective of the increasing effectiveness of policy measures as they move from planning and development stages to full implementation.

Table 2: Return on investment, by tobacco control policy/intervention (RSD billions), over five (2021-2025) and 15 (2021-2035) years[11]

Return on investment, by tobacco control policy	First 5 years (2021–2025)			All 15 years (2021–2035)		
	Total costs (billions)	Total benefits (billions)	ROI	Total costs (billions)	Total benefits (billions)	ROI
Tobacco control package* *(all policies/interventions implemented simultaneously)*	1.71	83	**48**	4.57	642	**140**
Raise cigarette taxes *(WHO FCTC Article 6)*	0.08	35	**436**	0.17	162	**975**
Protect people from tobacco smoke *(WHO FCTC Article 8)*	0.14	13.5	**99**	0.27	167	**630**
Warning labels *(WHO FCTC Article 11)*	0.07	10.8	**159**	0.14	135	**987**
Plain packaging *(WHO FCTC Guidelines for implementation of Articles 11 and 13)*	0.07	3.6	**53**	0.14	46	**335**
Public awareness campaigns *(WHO FCTC Article 12)*	0.77	13.7	**18**	1.85	169	**92**
Bans on advertising, promotion, and sponsorship *(WHO FCTC Article 13)*	0.07	14.0	**207**	0.14	173	**1,237**
Cessation: brief advice to quit *(WHO FCTC Article 14)*	0.43	0.44	**1**	1.69	7.59	**4**

* The combined impact of all interventions is not the sum of individual interventions. To assess the combined impact of interventions, following Levy and colleagues' (2018), "effect sizes [are applied] as constant relative reductions; that is, for policy i and j with effect sizes PRi and PRj, (1-PR ii) x (1-PR j) [is] applied to the current smoking prevalence [33]. The costs of the tobacco package include the costs of the examined policies, as well as programmatic costs to implement and oversee a comprehensive tobacco control programme.

Over the 15-year period, enacting and enforcing a comprehensive ban on all forms of tobacco advertising, promotion and sponsorship is expected to have the highest return on investment (1,237:1). Warning labels are expected to have the next highest return on investment (987:1), followed by raising tobacco taxes (975:1), creating smokefree public and work places (630:1), implementing plain packaging of tobacco products (335:1), public awareness of tobacco control issues (92:1), and promoting cessation of tobacco use and treatment for tobacco dependence by training health professionals to provide brief advice to quit tobacco use (4:1).

11 Rounded to the nearest whole number.

5. Examining additional impacts: Government revenue, equity and the SDGs

5.1 Tax analysis: the impact of increasing cigarette taxes on government revenue

In line with the Addis Ababa Action Agenda on Financing for Development [44], tobacco price and tax measures "represent a revenue stream for financing for development". In Serbia, under current plans specified in the amendment to the Law on Excise Duties, specific excise tax of RSD 75 per pack to RSD 90 in 2025. These increases are not expected to outpace rising Serbian incomes, meaning that even as cigarettes become slightly more expensive, they are not becoming less affordable.

This investment case analysis examines an alternative scenario in which Serbia chooses to increase cigarette taxes to outpace rising incomes and fulfill the EU Directive 2011/64/EU so that the overall excise tax rate is at minimum 90 euros per 1,000 cigarettes and at least 60 percent of the weighted average retail selling price [28]. The modelling in this investment case only considers tax on cigarettes and uses a hypothetical scenario in which the ad valorem and VAT tax rates stay the same, while the specific excise tax increases (in real terms) from RSD 75 now to RSD 170 in 2025.

Evidence from Serbia shows that on average a 10 percent increase in the price of cigarettes is expected to result in a 6.6 percent reduction in consumption. Factoring in income increases[12] in Serbia, under the described tax increase pattern modeled in this analysis and demand elasticities, licit cigarette consumption would drop from the present amount of about 643 million packets annually in 2020[13] to 511 million by 2025.

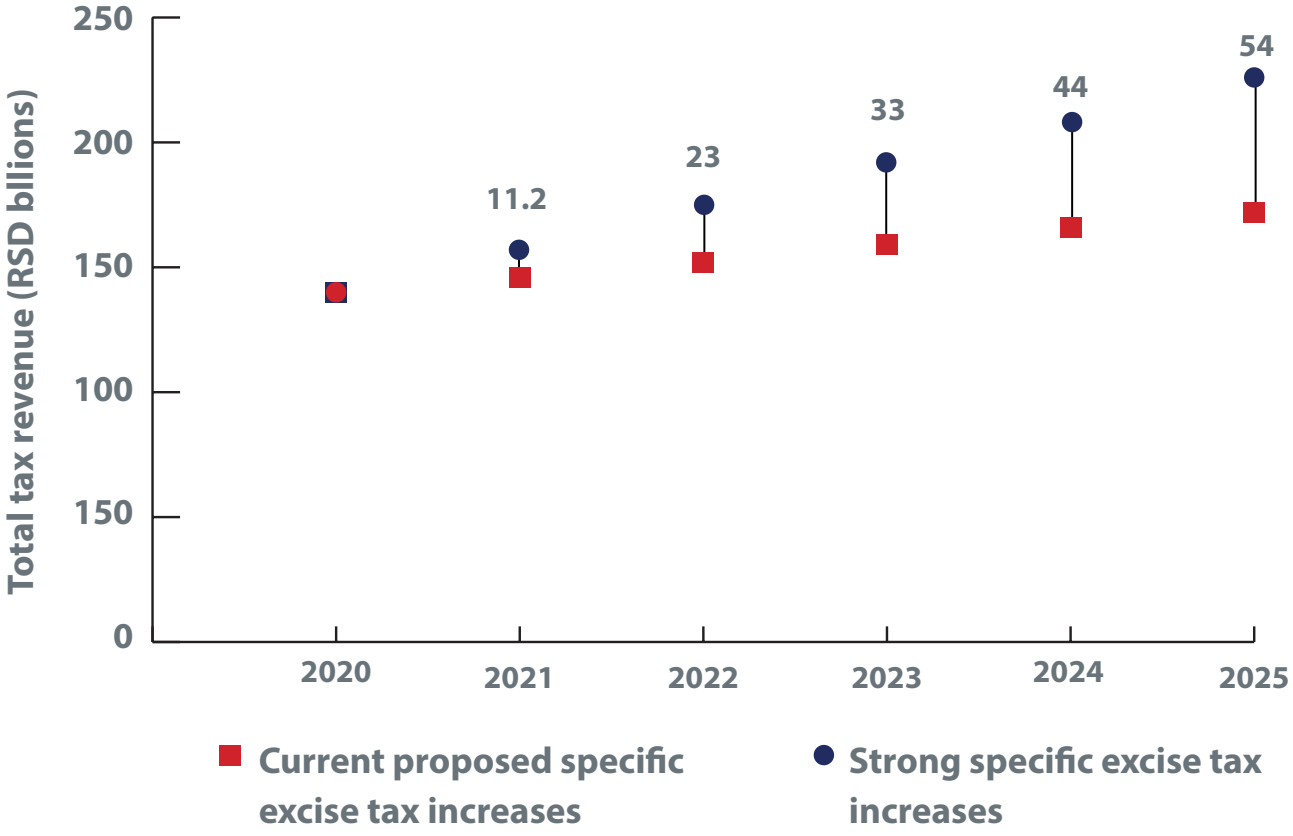
Even though there are drops in consumption, revenue gains will still occur. Although reducing the affordability of tobacco products leads people to quit smoking or reduce consumption, many people will still continue to smoke, largely because of the addictive nature of tobacco, paying higher taxes to the government each time they purchase cigarettes. Over a five-year period, **Figure 9** compares annual government cigarette tax revenue (undiscounted) in a hypothetical scenario where Serbia enacts stronger specific excise tax increases than those currently planned. The figure depicts a growing gap in annual tax collection between the two scenarios; in 2021, strong tax increases yield an additional RSD 11.2 billion, growing to RSD 54 billion in 2025.

12 Income price elasticity of demand - 1.058 [45]; income prevalence elasticity of demand – 0.609 [45]. Projected income growth over the period from 2020 to 2025 is estimated using real GDP growth projections from the International Monetary Fund as a proxy for income – 3.6 percent [46].

13 Author estimates based on 2019 packs sold and impact of estimated 2019 to 2020 cigarette price increases.

On average, over the five-year period enacting stronger specific excise tax increases could annually generate RSD 33 billion over and above what is estimated will be brought in under currently planned specific excise tax increases, the equivalent of about 12 percent of total government healthcare expenditures in 2018 [47]. Cigarette taxes can play a meaningful financing role as the government seeks to fulfill commitments to universal health coverage and other priorities in the context of an equitable COVID-19 response and recovery, and other priorities. Moreover, focusing on actions like increased tobacco taxation are shown to benefit the poorest the most, providing opportunity for the government to alleviate tobacco-related health problems and resulting medical costs for the poorest and create a more equitable society.

Fig. 9: Additional annual tax revenue (undiscounted) in comparison to the baseline scenario, 2021-2025



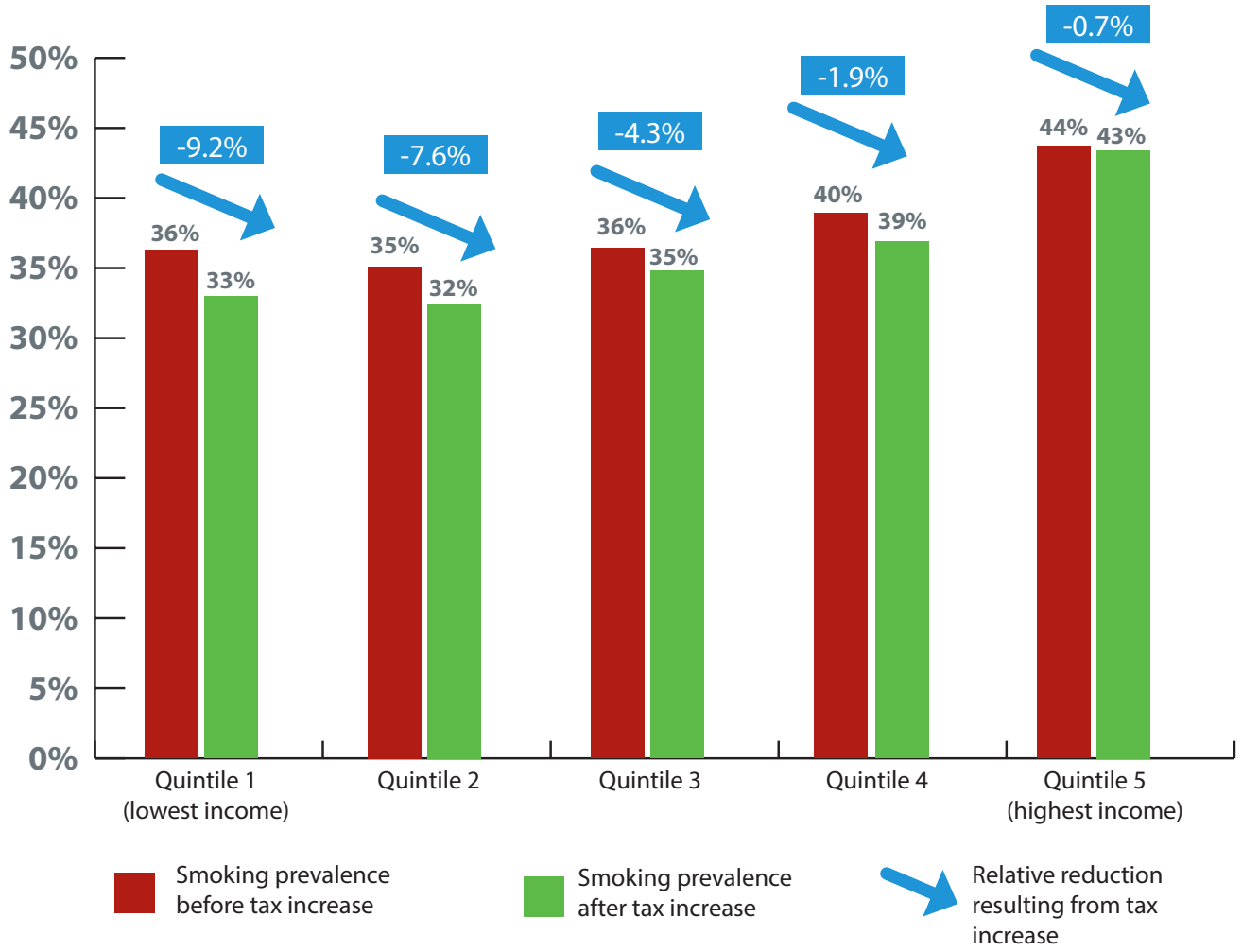
5.2 Equity analysis: benefits for low-income populations of increasing cigarette taxes

A common misconception is that taxes on tobacco products may disproportionately harm poor tobacco users since the tax burden represents a higher proportion of their income than wealthier tobacco users. However, evidence shows that the poor actually stand to benefit most from raised cigarette taxes [47]. Relative to richer smokers, lower-income smokers are more likely to quit smoking when taxes are increased [48], meaning they benefit from subsequent decreases in tobacco-related health problems and resulting medical costs which can be financially catastrophic. In Lebanon [49], for example, a 50 percent increase in cigarette prices was projected to prevent 23,000 households from falling into poverty over 50 years, and that same level of increase was found to avert catastrophic health expenditures for 1.83 million individuals in India, 440,000 in Bangladesh, and 350,000 in Viet Nam [50].

To examine the extent to which a cigarette tax increase could be considered pro-poor in Serbia, the investment case undertakes an equity analysis. The analysis divides Serbia's population into five equal groups by income, where quintile 1 is composed of the poorest 20 percent of people, and quintile 5 is composed of the wealthiest 20 percent. Within each income group, the analysis examines the impact of a hypothetical tax increase that raises the price of the average pack of cigarettes by about 16 percent (RSD 47, or about US$ 0.48). This is representative of the first year of tax increases that are modeled in the investment case.

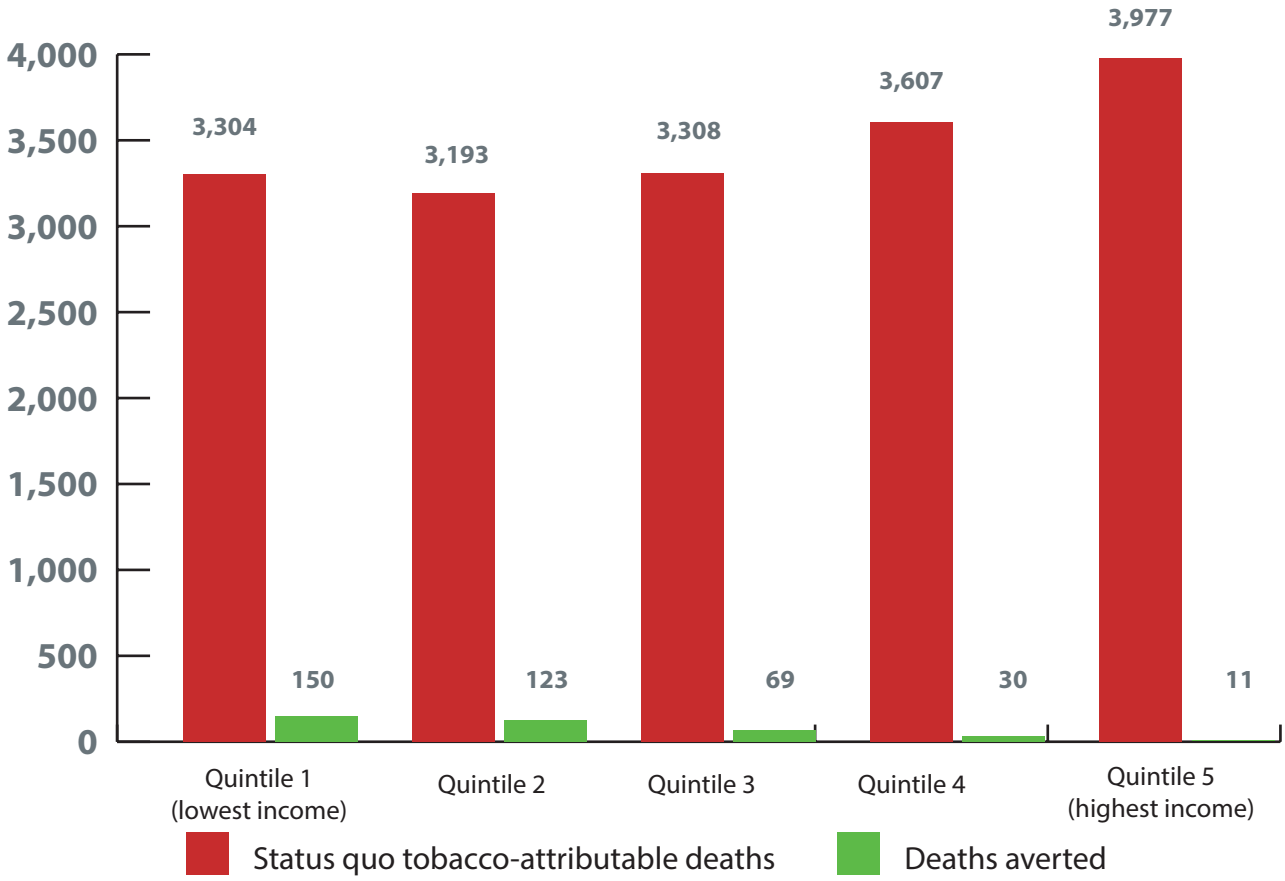
In Serbia, there are no large differences in cigarette smoking prevalence between income quintiles, though the highest prevalence is observed in the wealthiest income quintile [1]. However, evidence from a 2019 study on the impacts of increased taxes on consumer behavior in countries in Southeastern Europe shows that, in health terms, tax increases disproportionately benefit low-income groups. Evidence from Serbia shows that a 10 percent increase in price decreases smoking prevalence by 5.6 percent in low-income households, by 2.6 percent in middle-income households, and by 0.4 percent (though statistically insignificant) in high-income households [45]. The results from the analysis mirror these findings, because people with lower incomes are more responsive to changes in price, a tax increase that raises the cost by about 16 percent (representative of the first year of tax increases that are modeled in the investment case) causes the largest drop in smoking prevalence among the poorest income quintiles. **Figure 10** shows the smoking prevalence in each income quintile before and after the tax increase, as well as the relative change in smoking prevalence.

Fig. 10: Smoking prevalence before and after the cigarette tax increase, by income quintile



Of the over 19,800 tobacco-attributable deaths expected in one year if taxes were to stay the same, 37 percent would occur among the poorest 40 percent of the population (quintiles 1 and 2). However, because the tax increase causes smoking prevalence to fall the most in the two poorest quintiles, health benefits disproportionately accrue to lower-income Serbians. The equity analysis finds that 71 percent of the nearly 400 deaths that would be averted during the first year of tax increases modeled in the investment case would be among the poorest 40 percent of the population, as shown in **Figure 11.**

Fig. 11: Status quo deaths and deaths averted by tax increase, by income quintile



5.3 The Sustainable Development Goals and the WHO FCTC

Implementing the package of seven WHO FCTC policy actions will support Serbia to meet SDG Target 3.a to strengthen implementation of the WHO FCTC. Moreover, acting now will contribute to Serbia's efforts to meet SDG Target 3.4 to reduce by one-third premature mortality from NCDs by 2030. In Serbia in 2019, over 20,000 premature deaths between the ages of 30 to 70 were caused by the four main NCDs (CVD, diabetes, cancer, and COPD) [51]. Nearly two-fifths (39 percent) of these premature deaths occurred due to tobacco use [51]. Enacting the WHO FCTC measures identified in the investment case would reduce tobacco use prevalence—a key risk factor driving NCD incidence—preventing 16,948 premature deaths from the four main NCDs over the next 10 years (2021 to 2030). Preventing those deaths contributes about 22 percent of the needed reduction in premature mortality for Serbia to achieve SDG Target 3.4.

Achieving SDG Target 3.4 by 2030

By 2030 the WHO FCTC measures would...

Lower the prevalence of tobacco use by 41 percent from present day levels.

Reduce economic costs due to tobacco use by RSD 379 billion, including saving RSD 47 billion in healthcare expenditures.

Lead to savings (RSD 379 billion) that significantly outweigh the costs (RSD 3.3 billion), with an overall return on investment of 113:1.

6. Conclusion and recommendations

Each year, tobacco use costs RSD 269 billion in economic losses and causes substantial human development losses. Fortunately, the investment case shows that there is an opportunity to reduce the social and economic burden of tobacco in Serbia. Enacting the seven key WHO FCTC policy actions would save 4,841 lives each year and reduce the incidence of disease, leading to savings from averted medical costs and averted productivity losses. In economic terms, these benefits are substantial, adding to RSD 642 billion over the next 15 years. Further, the economic benefits of strengthening tobacco control in Serbia greatly outweigh the costs of implementation (RSD 642 billion in benefits versus just RSD 4.6 billion in costs).[14]

By investing now in the package of seven WHO FCTC policy actions modeled in this investment case, Serbia would not only reduce tobacco consumption, improve health, reduce government health expenditures, and grow the economy, it would also reduce hardships among Serbians, particularly among low-income populations. Many countries reinvest savings from healthcare expenditures and revenue from increased tobacco taxes into national development priorities such as social protection including universal health coverage, as well as COVID-19 response and recovery efforts.

Based on the findings of this investment case, these key actions for Serbia are recommended to be pursued simultaneously:

Strengthen tobacco control governance by developing and adopting a new national multisectoral tobacco control strategy and by improving multisectoral collaboration.

A strong, coordinated and multi-stakeholder approach to tobacco control is critical. This investment case demonstrates that tobacco control does not just benefit the health sector, nor should it be the health sector's responsibility alone. The socioeconomic harms of tobacco consumption in Serbia are vast and manifest across society, hampering national development. Addressing tobacco will increase Serbia's productivity, protect its human capital, avoid healthcare costs for the government and citizens, and, in the case of effective tobacco taxation, raise important revenue for development, especially in the context of COVID-19 response and recovery.

14 Figures subject to rounding.

Building on the strong principles outlined in Serbia's previous tobacco control strategy, it is recommended that Serbia pursue a new national multisectoral tobacco control strategy, with a concrete action plan oriented around investment case findings and emerging issues such as water pipe/electronic nicotine delivery systems and youth consumption. Every step of creating, implementing and monitoring this strategy and action plan should emphasize effective multi-stakeholder engagement including with civil society and academia. Tobacco control can and should be an integral part of COVID-19 response and recovery.

Alongside the new national multisectoral tobacco control strategy, it is recommended that Serbia strengthen national multisectoral coordination. The Office for the Prevention of Smoking and the Committee for the Prevention of the Use of Tobacco could form the basis for a national coordinating mechanism (NCM) for tobacco control in Serbia in accordance with Article 5.2(a) of the WHO FCTC. The NCM should be granted additional resources to support its activities, using near-term investment case benefits as a rationale, and regular participation of high-level political representatives across the executive branch, ministries of finance and economy, and others should be encouraged, in addition to technical experts.

In taking the above actions, it is recommended that the government follow the Guidelines for implementation of Article 5.3 of the WHO FCTC adopted at the Conference of the Parties (decision FCTC/COP3(7)) as well as the technical guidance found in the Convention Secretariat-UNDP Toolkits for Parties to implement Articles 5.1 and 5.2 of the WHO FCTC [52], [53]. The Convention Secretariat-UNDP Toolkits emphasize why different sectors and stakeholders should engage in a whole-of-society response in line with their own objectives, as well as what roles they can play.

Reduce affordability of tobacco products by raising excise taxes on tobacco and by regularly adjusting the tax rate to keep pace with the growth of incomes and/or inflation.

Prices of tobacco products are one of the strongest factors affecting consumption. In Serbia, cigarettes remain widely affordable which is conducive to tobacco use, particularly among youth and other vulnerable populations [38], [27], [37]. The investment case demonstrates that raising cigarette taxes would yield the highest return on investment over the next five years, delivering Serbia RSD 436 in avoided healthcare costs and economic losses for every RSD 1 invested. Adding to this is the RSD 33 billion in annual tax revenues Serbia is projected to receive over the next five years from the tax increases, as well as the relatively stronger health and economic benefits among lower-income populations in advancement of equity, contrary to what tobacco industry backed studies on regressivity may show. The additional revenue can be used to help finance the

recommended national coordination mechanism for tobacco control, stronger tobacco control policies and healthcare in line with the investment case, and/or an equitable COVID-19 response and recovery for the Serbian population.

It is recommended that Serbia increase or adjust tobacco tax rates regularly taking into account or automatically adjusting for inflation rates and income growth, and harmonize taxes across all tobacco products to reduce the likelihood of product substitution. To satisfy EU Directive 2011/64/EU it is recommended that Serbia increase tax rates so that the overall excise tax rate is at minimum 90 Euros per 1,000 cigarettes and at least 60 percent of the weighted average retail selling price [28]. Additionally, increasing excise tax rates can help Serbia reach the recommendation for excise taxes to account for 70 percent of the price from both the WHO FCTC Guidelines for implementation of Article 6 [29] and the WHO technical manual on tobacco tax policy and administration [28]. All types of tobacco (including for smokeless tobacco and novel tobacco products) should be subjected to excise tax rates comparable to those applied to traditional tobacco products. To further strengthen the tobacco tax structure, Serbia can ensure that the tax base of the ad valorem component is retail price, introduce a minimum specific excise tax, and enforce bans on promotional price discounts. Serbia should also leverage the Protocol to Eliminate Illicit Trade in Tobacco Products, to which it became a Party in 2018, to strengthen efforts to combat illicit trade, including by closing loopholes in current tobacco control legislation.

Commit to fully implement the WHO FCTC and take immediate action to strengthen the other six key WHO FCTC policy actions modeled in this investment case.

As a Party to the WHO FCTC, Serbia is encouraged to fully implement the treaty, with a focus on the recommendations made for Parties in the Global Strategy to Accelerate Tobacco Control: Advancing Sustainable Development through the Implementation of the WHO FCTC 2019–2025, in relevant WHO FCTC guidelines for implementation, in WHO FCTC Needs Assessment reports and in this investment case.

The investment case has shown the health and economic benefits of strengthening implementation of the modeled WHO FCTC measures. Thus in addition to increasing tobacco taxes, Serbia is recommended to take immediate action to implement the following:

- Make all public and workplaces smokefree in line with WHO FCTC Article 8 and its guidelines for implementation, including eliminating all indoor designated smoking areas;
- Require graphic health warnings that are rotated on a regular basis. Increase the size of the warnings on tobacco product packaging to reach at least 50 percent of the principle display areas in line with WHO FCTC Guidelines for implementation of Article 11;

- Consider implementing plain packaging to reduce the attractiveness of tobacco products and make health warnings more prominent, in line with WHO FCTC Guidelines for implementation of Article 11 and WHO FCTC Guidelines for implementation of Article 13 of the WHO FCTC;
- Comprehensively ban all forms of tobacco advertising, promotion and sponsorship by removing exemptions, closing loopholes and aligning fully with the WHO FCTC and the guidelines for implementation of Article 13;
- Promote cessation of tobacco use and treatment for tobacco dependence by training health professionals to provide brief advice to quit tobacco use, especially in primary care settings. Serbia can offer further support by providing a national toll-free quit line and/or internet based quit support; NRT and pharmacotherapies making them free of cost if possible, in line with WHO FCTC Article 14 and its guidelines;
- Promote and strengthen public awareness of tobacco control issues, including the health risks of tobacco use and tobacco smoke, addiction, and the benefits of cessation in line with WHO FCTC Article 12; and
- Require graphic health warnings on tobacco product packaging that describes the harms of tobacco use in line with WHO FCTC Article 11.

Take strong policy measures to counter tobacco industry interference.

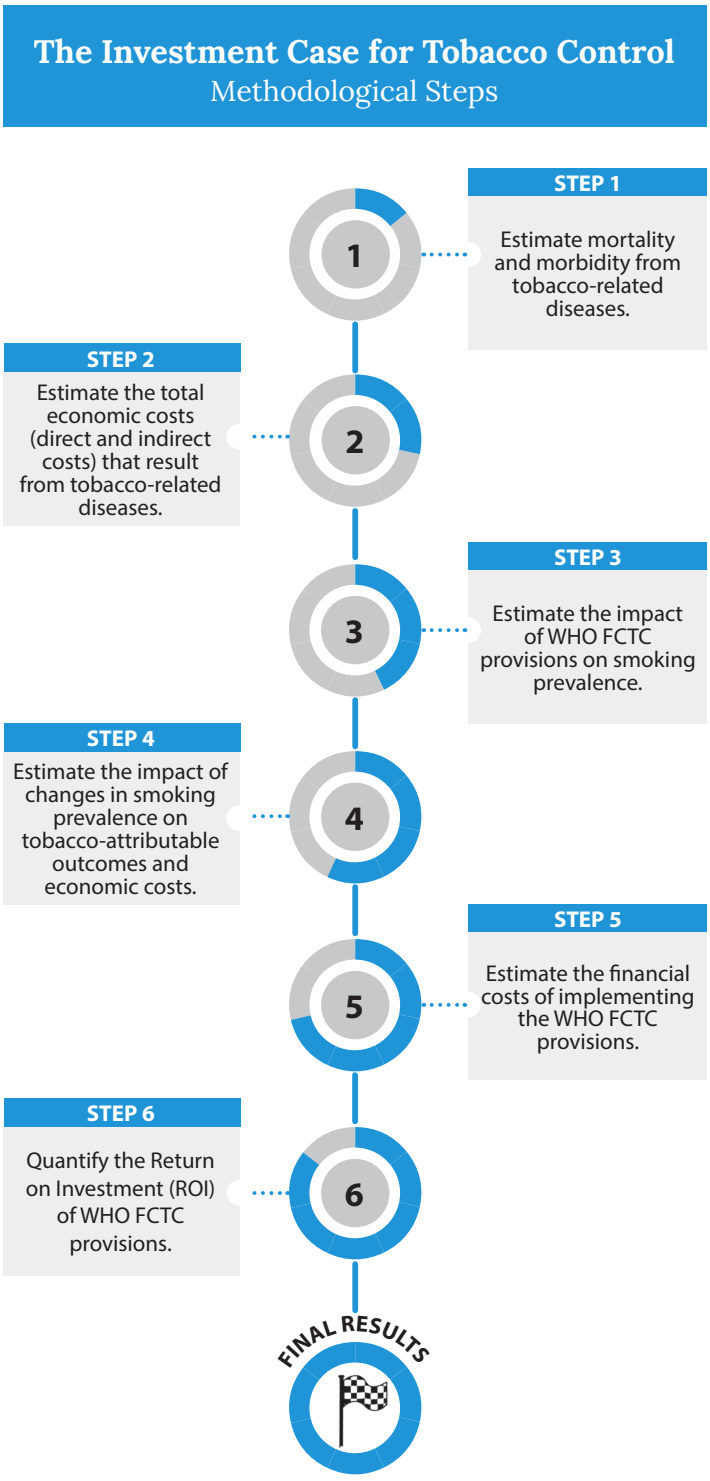
The tobacco industry remains one of the biggest challenges to continued and sustained progress towards full implementation of the WHO FCTC globally, and there are known examples of tobacco companies' efforts to influence the decisions of Serbian authorities in the area of tobacco control [38]. However, it is clear that the interests of the tobacco industry to maximize profits and of the Serbian people to ensure health and well-being as well as economic productivity, radically diverge. WHO FCTC Article 5.3, which Serbia is legally obliged to implement, states that "[i]n setting and implementing public health policies with respect to tobacco control, Parties shall act to protect these policies from the commercial and other vested interests of the tobacco industry in accordance with national law." Notably, this applies to the entire government, not just ministries of health. It is recommended that the Government introduce transparency and accountability measures to reduce tobacco industry interference in policymaking, including codes of conduct for civil servants and conflict of interest identification and management mechanisms (e.g. disclosure forms). The MoH, with partners, should sensitize legislative and executive government branches as well as all state officials to the true costs of tobacco. This should include the socio-economic benefits of stronger action and WHO FCTC Art 5.3 and its guidelines for implementation including pertaining to tobacco industry attempts to use corporate social responsibility to promote its products and gain favor with policymakers.

7. Methodology annex

7.1 Overview

The economic analysis consists of two components: 1) assessing the current burden of tobacco use and 2) examining the extent to which WHO FCTC provisions can reduce the burden. The first two methodological steps depicted in **Figure A1** are employed to assess the current burden of tobacco use, while methodological steps 3-6 assess the impact, costs, and benefits of implementing or intensifying WHO FCTC provisions to reduce the demand for tobacco. The tools and methods used to perform these methodological steps are described in detail below.

Fig. A1: Steps in the investment case



7.2 COMPONENT ONE: CURRENT BURDEN

The current burden model component provides a snapshot of the current health and economic burden of tobacco use in Serbia.

STEP 1

Estimate mortality and morbidity from tobacco-related diseases.

The investment case model is populated with country-specific data on tobacco-attributable mortality and morbidity from the 2019 Global Burden of Disease Study (GBD) [3], [54]. The study estimates the extent to which smoking and secondhand tobacco smoke exposure contribute to the incidence of 37 diseases, healthy life-years lost, and deaths, across 195 countries. GBD data for Serbia is inclusive of Kosovo[15] and Metohija. In order to align with all other data inputs which do not include data for Kosovo[15] and Metohija, GBD data was adjusted using a previous estimate of smoking-attributable mortality in the Republic of Serbia (exclusive of Kosovo[15] and Metohija) [4]. This previous study contained a subset of the diseases that are included in GBD; these diseases were matched to corresponding diseases in the GBD data and the number of tobacco-attributable deaths in each dataset was compared. Overall, the number of smoking-attributable deaths in the previous Serbian study was 74.6 percent of the number of smoking-attributable deaths estimated by GBD. All GBD mortality and morbidity data was multiplied by 0.746 to reduce estimates to account for the exclusion of Kosovo[15] and Metohija.

15 All references to Kosovo in this document should be understood to be in the context of the United Nations Security Council resolution 1244 (1999).

STEP 2

Estimate the total economic costs (direct and indirect costs) that result from tobacco-attributable diseases.

Next, the model estimates the total economic costs of disease[16] and death caused by tobacco use, including both direct and indirect costs. Direct refers to tobacco-attributable healthcare expenditures. Indirect refers to the value of lives lost due to tobacco-attributable premature mortality, and workplace productivity losses: absenteeism, presenteeism, and excess breaks due to smoking.

Direct costs — Direct costs include tobacco-attributable public (government-paid), private (insurance, individual out-of-pocket), and other healthcare expenditures. The proportion of healthcare costs attributable to smoking was obtained using the formula for estimating smoking attributable fraction (SAF) of healthcare expenditures from Goodchild et al. (2018) [5]. The investment case utilizes the average smoking-attributable fraction of healthcare expenditures of upper middle-income countries in the Europe and Central Asian region for which estimates are available in the Goodchild paper; this comes out to 7.7 percent. To calculate the share of smoking-attributable healthcare expenditures borne by public, non-profit, and private entities, it was assumed that each entity incurred smoking-attributable healthcare costs in equal proportion to its contribution to total health expenditure. Healthcare expenditures were obtained from data provided by the Institute of Public Health of Serbia [43].

Indirect costs — Indirect costs represent the monetized value of lost time, productive capacity, or quality of life as a result of tobacco-related diseases. Indirect costs accrue when tobacco use causes mortality, eliminating the unique economic and social contributions that an individual would have provided in their remaining years of life. In addition, tobacco use results in productivity losses. Compared to non-tobacco users, individuals who use tobacco are more likely to miss days of work (absenteeism); to be less productive at work due tobacco-related illnesses (presenteeism); and to take additional breaks during working hours to smoke.

16 In assessing the current burden of tobacco use, the economic costs of tobacco-attributable mortality include the cost of deaths due to any form of exposure to tobacco (including smoking, secondhand smoke exposure, and the use of other types of tobacco products). Only smoking-attributable (not tobacco-attributable) costs are calculated for healthcare expenditures, absenteeism, presenteeism, and smoking breaks. While other forms of tobacco use may also cause losses in these categories, no data is available to precisely ascertain those losses.

- *The economic cost of mortality due to tobacco use* — Mortality is valued using the human capital approach, which places an economic value on each year of life lost. Using GBD data on the age at which tobacco-attributable deaths occur, the model calculates the total number of years of life lost due to tobacco, across the population. Each year of life is valued at 1.4 times GDP per capita, following the "full income approach" employed by Jamison et al (2013) [55]. Inclusion of all deaths due to tobacco and not just employed or working age deaths is an established methodology that has been utilized in the valuation of mortality for other public health challenges [56], [57].

- *Productivity costs* — Productivity costs consist of costs due to absenteeism, presenteeism, and excess work breaks due to smoking. The model incorporates estimates from academic literature on the number of extra working days missed due to active smoking (2.9 days per year) [58]. Presenteeism losses are obtained similarly, under research that shows that smokers in China, the US, and five European countries experience about 22 percent more impairment at work because of health problems compared to never-smokers [59]. Lost productivity due to smoking breaks is valued under the conservative assumption that working smokers take ten minutes of extra breaks per day [40].

7.3 COMPONENT TWO: POLICY/INTERVENTION SCENARIOS	This component estimates the effects of WHO FCTC tobacco control measures on mortality and morbidity, as well as on total economic costs (direct and indirect) associated with tobacco use.

The investment case employs a static model to estimate the total impact of the tobacco control measures, meaning that aside from smoking prevalence, variables do not change throughout the time horizon of the analysis. The model follows a population that does not vary in size or makeup (age/gender) over time in two scenarios: a status quo scenario in which smoking prevalence remains at present day rates, and an intervention scenario in which smoking prevalence is reduced according to the impact of tobacco control measures that are implemented or intensified. Published studies have used similar static models to estimate the impact of tobacco control measures on mortality and other outcomes [60], [61].

Within the investment case, the mortality and morbidity, as well as economic costs that are computed in the intervention scenario, are compared to the status quo scenario to find the extent to which tobacco control measures can reduce health and economic costs.

STEP 3

Estimate the impact of WHO FCTC tobacco control provisions on smoking prevalence.

Selection of priority WHO FCTC measures modeled within the investment case aligns with the Global Strategy to Accelerate Tobacco Control developed following a decision at the Seventh session of the Conference of the Parties (COP7) to the WHO FCTC. Under Objective 1.1 of the Strategy, priority is given to enabling action to accelerate WHO FCTC implementation, including effective forms of technical and financial assistance to support Parties in the identified priority action areas. This includes Parties giving priority to, inter alia, the implementation of price and tax measures (WHO FCTC Article 6) and time-bound measures of the Convention. The time-bound measures are for creating smokefree public and work places (WHO FCTC Article 8), prominent health warnings on tobacco packaging (WHO FCTC Article 11) and plain packaging (WHO FCTC Guidelines for implementation of Article 11 and WHO FCTC Guidelines for implementation of Article 13), and comprehensive bans on tobacco advertising, promotion and sponsorship (WHO FCTC Article 13). The impacts of implementing the WHO FCTC provisions are obtained from the literature. The impact of enforcing smokefree air laws, implementing plain packaging, intensifying advertising bans, and public awareness of tobacco control issues are derived from Levy et al. (2018) [43] and Chipty (2016) [62], as adapted within the Tobacco Use Brief of Appendix 3 of the WHO Global NCD Action Plan 2013–2020 [63], and adjusted based on assessments of Serbia's baseline rates of implementation. Brief advice to quit from primary care health professionals is assumed to increase quit attempts by 60 percent [64] from baseline rates (12 percent of adults make at least one quit attempt annually [1]) for individuals who receive the advice.

Except for taxes—the impact of which is dependent on the timing of increases in tax rates (described below)— and the brief cessation advice intervention—the impact of which is guided by rates of training for primary health care providers (see also below)—the full impact of the measures is phased in over a five-year period. The phase-in period follows WHO assumptions [65] that two years of planning and development are required before policies are up and running, followed by three years of partial implementation that are reflective of the time that is needed to roll out policies, and work up to full implementation and enforcement.

Tobacco taxes — The impact of cigarette tax increases on revenue and cigarette use prevalence was estimated using an Excel-based tool developed to analyze the impact of tax increases on a fixed population cohort. The tool is populated with data, including on current cigarette smoking prevalence, the tax structure and applied tax rates, cigarette prices, demand elasticities, and inflation and income projections (see **Table A1**).

Table A1. Key parameters used in the tax revenue analysis

Parameter name	Value	Source
Price elasticity of demand	-0.659	[45]
Prevalence elasticity of demand	-0.265	[45]
Income price elasticity of demand	1.058	[45]
Income prevalence elasticity of demand	0.609	[45]
Number of licit cigarette packs sold (2019)	643 million	Country correspondence*
Projected real income growth rate**	3.6%	[46]

* Projected real income growth is used as a proxy for wage growth. The International Monetary Fund projects [36] real GDP growth at an average of 2.3 percent annually through 2025.

** Projected real income growth is used as a proxy for wage growth. The International Monetary Fund projects [46] real GDP growth at an average of 3.6 percent annually through 2025.

Tobacco use in Serbia remains high. Nearly four out of every ten people smoke, and over eighty percent of smokers reported that the current pattern of small tax increases has not caused them to change their rate of consumption [1]. Under current plans, specific excise taxes will continue to gradually increase from the current specific excise tax of RSD 75.3 per pack to RSD 90.3 in 2025. These increases are not expected to outpace rising Serbian incomes, meaning that even as cigarettes become more slightly more expensive, they are not becoming less affordable for the population negating the effect of the tax increase.

The investment case analysis examines an alternative scenario in which Serbia chooses to enact strong tax increases that not only outpace rising incomes but also fulfill European Union (EU) Directive 2011/64/EU, supporting Serbia's EU candidacy.[17] In the hypothetical scenario, ad valorem and VAT tax rates stay the same, while the specific excise tax rises (in real terms) from RSD 75 in 2020 to RSD 170 in 2025.[18] In the scenario, the price net of taxes continues to grow at about 6.3 percent annually in real terms, following observed average increases in Serbia over the past five years (2015 to 2019). **Table A2** breaks down cigarette pack price components from 2020 to 2025 under the described specific excise tax increases.

17 Directive 2011/64/EU requires that member countries' overall excise tax rate must be 1) at least 90 Euros per 1,000 cigarettes and 2) at least 60 percent of the weighted average retail selling price European Commission Taxation and Customs Union [30].

18 In the scenario, per pack net of tax price is projected to increase by about 6.3 percent year over year, in line with increases observed over the period from 2015 to 2019.

Table A2. Projected cigarette pack price in the tax increase scenario (RSD)

Price component	2020	2021	2022	2023	2024	2025
Price net of taxes	69.98	72.58	75.27	78.06	80.95	83.96
Specific excise	75.25	96.35	116.36	135.32	153.27	170.25
Ad valorem	95.23	110.76	132.11	150.84	169.78	188.95
Value added tax	48.09	55.94	63.46	70.66	77.56	84.18
Final Consumer Price	**288.55**	**335.63**	**387.20**	**434.88**	**481.57**	**527.33**

Component parts may not sum to final consumer price due to underlying rounding.

The impact of these increases on revenue and cigarette use prevalence is dependent on prevailing elasticities: the extent to which individuals change use of a product (e.g., decrease consumption or quit) because of changes in the price of a tobacco product. Changes are calculated following Joosens and colleagues (2009) [66], who use a log-log function to ensure large price increases do not result in implausible reductions in consumption or prevalence. Below, **Equation A1** provides an example of calculations to ascertain the impact of a change in price on smoking prevalence, considering changes in income.

Equation A1.

$$\Delta SP_i = SP_{i-1} * ((EXP\left(\varepsilon p * LN(op_{np})\right)) - 1 - \left[\frac{1+\varepsilon_i\left(\frac{GDP_2-GDP_1}{GDP_2+GDP_1}\right)}{1-\varepsilon_i\left(\frac{GDP_2-GDP_1}{GDP_2+GDP_1}\right)}\right]$$

Where:
SP = smoking prevalence (# of smokers) in year i
Ɛp = prevalence elasticity
Op_np = the ratio of the old price of a pack of cigarettes to the new price after tax increases
Ɛi = income elasticity
GDP = Gross domestic product in year

There are several limitations to the tax analysis. First, the tax tool assumes that the price and tax structure of the most sold brand of cigarettes is representative of the market, and it does not incorporate other market segments (high or low-end cigarettes). More detailed models that account for switching between segments or between products (e.g., movement to hand-rolled cigarettes) would capture nuance helpful to framing tobacco tax policy and estimating impact. Second, the analysis assumes a full pass-through of the tax increases. This assumption reflects a "middle ground" approach, but, in reality, the tobacco industry may increase or decrease prices in reaction to the price increase.

The impact sizes of all policy measures examined in the investment case are displayed in **Table A3**. Additional information on their derivation can be found in the *Technical Appendix*.[19]

Table A3. Impact size: Relative reduction in the prevalence of current smoking by tobacco control policy/intervention, over five (2021-2025) and 15 years (2021-2035)

WHO FCTC Policy Actions	Relative reduction in the prevalence of current smoking	
	First 5 years (2021–2025)	Over 15 years (2021–2035)
Tobacco Control Package (all policies/interventions implemented simultaneously)	**20%**	**42%**
Increase taxes on cigarettes *(WHO FCTC Article 6)*	5.1%	9.7%
Create smokefree indoor public and work places *(WHO FCTC Article 8)*	4.0%	10.0%
Mandate that tobacco product packages carry large health warnings *(WHO FCTC Article11)*	3.2%	8.0%
Implement plain packaging of tobacco products *(WHO FCTC Guidelines for implementation of Article11 and WHO FCTC Guidelines for implementation of Article 13)*	1.1%	2.7%
Promote and strengthen public awareness of tobacco control issues, including the health risks of tobacco use and tobacco smoke, addiction, and the benefits of cessation *(WHO FCTC Article12)*	4.1%	10.2%
Enact and enforce comprehensive bans on tobacco advertising, promotion and sponsorship *(WHO FCTC Article 13)*	4.2%	10.4%
Promote tobacco cessation and treatment of dependence by training health professionals to provide brief advice to quit tobacco *(WHO FCTC Article 14)*	0.1%	0.7%

* The combined impact of all interventions is not the sum of individual interventions. Following Levy and colleagues (2018) "effect sizes [are applied] as constant relative reductions; that is, for policy i and j with effect sizes PRi and PRj, (1-PR ii) x (1-PR j) [is] applied to the current smoking prevalence" [43].

19 Available upon request.

STEP 4

Estimate the impact of changes in smoking prevalence on tobacco-attributable health outcomes and economic costs.

To analyze the impact of policy measures on reducing the health and economic burden of smoking, the investment case calculates and compares two scenarios. In the status quo scenario, current efforts are 'frozen', meaning that, through the year 2035 (end of the analysis), no change occurs from the tobacco control provisions that are currently in place. In the intervention scenario, Serbia implements new tobacco measures or intensifies existing ones, to reduce the prevalence of smoking. The difference in health and economic outcomes between the status quo and intervention scenarios represents the gains that Serbia can achieve by taking targeted actions to reduce tobacco use.

The marginal effects of the policies are calculated using the status quo scenario as the comparison group. To calculate marginal effects, the model subtracts the outcome (risk factor attributable deaths, healthcare expenditures, etc.) under the intervention scenario from the same outcome under the status quo scenario. The difference between the two outcomes is the amount of change in the outcome associated with the policy.

Marginal Effects = Outcome Base Scenario — Outcome Intervention Scenario

Marginal effects are calculated as follows for each outcome:

- **Health outcomes:** To calculate the reductions in mortality and morbidity due to implementation of the policy measures, forecasted changes in smoking prevalence are applied directly to the GBD risk factor attributable outcomes from the status quo scenario. This means that the model adjusts the risk factor attributable outcomes for mortality and morbidity as reported by GBD based on year-over-year relative changes in smoking prevalence for each outcome.
- **For healthcare expenditures**, the model applies forecasted annual relative changes in smoking prevalence for each intervention scenario to the SAFs. SAFs are adjusted in proportions equal to the relative change in smoking prevalence for each intervention scenario.
- **Workplace smoking outcomes** are recalculated substituting actual (status quo) smoking prevalence for estimated annual smoking prevalence for each of the intervention scenarios that are modeled.

STEP 5

Estimate the financial costs of implementing the tobacco control policies and interventions modeled, both individually and collectively.

The financial costs to the government of implementing new measures—or of intensifying or enforcing existing ones—are estimated using the WHO NCD Costing Tool. Full explanations of the costs and assumptions embedded in the WHO NCD Costing tool are available [65].

The Tool uses a 'bottom up' or 'ingredients-based' approach. In this method, each resource that is required to implement the tobacco control measure is identified, quantified, and valued. The Tool estimates the cost of surveillance, human resources—for programme management, transportation, advocacy, and enacting and enforcing legislation—trainings and meetings, mass media, supplies and equipment, and other components. Within the Tool, costs accrue differently during four distinct implementation phases: planning (year 1), development (year 2), partial implementation (years 3-5), and full implementation (years 6 onward).

Across these categories, the Tool contains default costs from 2011, which are sourced from the WHO CHOICE costing study. Following Shang and colleagues, the Tool is updated to reflect 2019 costs by updating several parameters: the US$ to local currency unit exchange rate (2019), purchasing power parity (PPP) exchange rate (2019), GDP per capita (PPP, 2019), population (total, and share of the population age 15+, 2019), labor force participation rate (2019), gas per liter, and government spending on health as a percent of total health spending (2018) [67]. Unless government or other in-country parameters are received, data is from the World Bank database, with the exception of data on the share of government health spending and population figures. The share of government spending on health as a percent of total health spending is derived from the WHO Health Expenditures database, and population figures are from the UN Population Prospects.

STEP 6

Quantify the return on investment (ROI) for the various tobacco control policies and interventions modeled, both individually and collectively.

The return on investment (ROI) analysis measures the efficiency of tobacco control investments by dividing the discounted monetary value of health gains from investments by their discounted respective costs.

ROIs were calculated for each of the seven tobacco control policies modeled, and for the seven interventions together as a package. Estimates from Step 3 and 4, were used to calculate ROIs at 5- and 15-year intervals.

$$\textbf{Return on investment (ROI)} = \frac{\text{Benefits of intervention/policy}}{\text{Costs of implementing intervention/policy}}$$

7.4 Equity analysis

To assess how increased cigarette taxation affects different income groups, different income groups' responses to changes in price were estimated, i.e. their elasticity of smoking participation. Tobacco prevalence by income band (less than 200 Euros, 201 to 400 Euros, 401 to 600 Euros, 601 to 800 Euros, and above 800 Euros) was sourced from the Adult Tobacco Consumption in Serbia, 2019 report [1]. Weighted percentage distribution of respondents in each income band was used to create income quintiles for the equity analysis. Price elasticity of smoking participation for low-income, middle-income, and high-income Serbians was sourced from a report on the impact of excise taxes on consumption in Southeast European countries by Zubović et al. (2019) [44]. Elasticity was similarly weighted and adjusted to create income quintile elasticity figures.

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