POTENTIAL IMPACT OF STRONG TOBACCO-CONTROL POLICIES IN 11 NEWLY INDEPENDENT STATES

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SUMMARY

Objective: While some countries of the WHO European Region are global leaders in tobacco control, the Newly Independent States (NIS) have the highest tobacco-smoking prevalence globally and a relatively low overall level of the WHO Framework Convention on Tobacco Control (WHO FCTC) implementation. An abridged version of the SimSmoke tobacco control policy simulation model has been developed to project the health impact of implementing tobacco-control policies in line with the WHO FCTC.

Methods: Data on population size, smoking prevalence, policy-specific effect sizes and formulas were applied in 11 NIS – Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, the Russian Federation, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan. The aim was to project the relative reduction in smoking prevalence, number of smokers and number of smoking-attributable deaths resulting from implementing six individual and/or combined WHO FCTC measures.

Results: An increase in excise cigarette taxes to 75% of price yields the largest relative reduction in smoking prevalence (range 12.1–44%) for all countries. The projections show that when all six tobacco control measures are fully implemented in line with the WHO FCTC, smoking prevalence in each of the NIS countries can be reduced by at least 39% by the year 2033 (baseline 2015).

Conclusion: The projections show that the NIS countries can expect a large number of smoking-attributable deaths just among those smokers alive today, but large reductions in smoking prevalence and smoking-attributable deaths can be achieved if the WHO FCTC demand reduction policies are implemented. The results can be used as an advocacy tool for accelerating enforcement of tobacco control laws in NIS.

Key words: tobacco control, newly independent states, policy, prevention, SimSmoke, WHO FCTC

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INTRODUCTION

Although smoking is the most preventable cause of premature mortality, at least 6 million deaths worldwide can be attributed to smoking each year (1). To address this problem, the World Health Organization (WHO) and its Member States have set a voluntary global target of a 30% relative reduction in the prevalence of current tobacco use by 2025 (2). Strengthening WHO FCTC implementation through the Health 2020 policy framework and the roadmap of actions to strengthen implementation of the WHO FCTC 2015–2025 would ensure that no country is left behind.

WHO provides technical guidance on how to achieve the voluntary global target through a set of six demand-reduction measures (3) named MPOWER (4). The MPOWER measures are: monitor tobacco use and prevention policies; protect people from tobacco smoke; offer help to quit tobacco use; warn about the dangers of tobacco; enforce bans on tobacco advertising, promotion and sponsorship; and raise taxes on tobacco. Each has been shown to reduce the prevalence of tobacco smoking, but the effect depends on their level of implementation and the implementation of other tobacco-control policies (5, 6). Policymakers need to know the individual and combined effects of those measures (4) to support efforts to reach the WHO global target by 2025 (2).

The SimSmoke tobacco control simulation model has been developed for eight states in the United States and more than 30 countries (7–11). Building on that model, a simplified, Excel-based version has been developed (12). Abridged SimSmoke requires less data than the original SimSmoke and uses data collected for the biennial WHO global tobacco-control reports (GTCRs) (13). With enhanced simplicity and user-friendliness, Abridged SimSmoke still projects the individual and combined effects of MPOWER measures on smoking prevalence and number of smoking-attributable deaths, consequently enabling policymakers to better develop country-specific targets and strategies.

This paper estimates the effect of applying the six tobacco control policies included in the MPOWER package on smoking prevalence (at 5, 15 and 40 years) and associated mortality (at 40 years) in eleven Newly Independent States (NIS): Armenia,

Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, the Russian Federation, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan. These countries have relatively high levels of smoking, and thus the potential for policies to have a major impact.

Tobacco-smoking prevalence in the selected countries is lower in females (ranging from 0.0% in Azerbaijan to 16.1% in the Russian Federation) than in males (ranging from 15.5% in Turkmenistan to 55.5% in Georgia). Differences in these rates reflect the levels of policies implemented. Russian Federation and Turkmenistan were the only countries implementing comprehensive smoke-free policies in 2014, the former also having a complete ban on tobacco marketing, while the latter had health warnings at the recommended level (which was also the case for Ukraine). Mass-media campaigns were at high levels in Belarus, Kazakhstan, the Russian Federation, and Turkmenistan. Tobacco cessation support was generally weak in all countries and no country had taxes amounting to at least 75% of the retail price of cigarettes in 2014 (13).

MATERIALS AND METHODS

Abridged SimSmoke uses data from a single year to project short-term (five years), mid-term (15 years) and long-term (40 years) effects of implementing each tobacco control policy on initial smoking prevalence. Abridged SimSmoke uses formulas similar to the complete SimSmoke to project the long-term effect of tobacco control policies on the number of smokers and premature smoking-attributable deaths among current smokers alive today.

Smokers and Smoking-Attributable Deaths

The number of smokers by gender in each country is obtained by multiplying the respective smoking prevalence and corresponding population size. The number of premature smoking-attributable deaths is then determined using a formula suggested by Doll et al. (14), with the number of deaths averted in the long term calculated as 50% of the number of smokers. These estimates are based on high-income countries (HICs), which we expect closely reflect the effects for low and middle-income countries (LMICs) as their income increases. However, because study (15) has shown that LMICs have lower relative mortality risks, the estimated smoking-attributable deaths for these countries are multiplied by 0.65 to also provide more conservative estimates for these countries.

Tobacco-Control Policies and Effect Sizes

Abridged SimSmoke uses SimSmoke policy effect-size estimates that are based on literature reviews (5), advice from expert panels and model validation (7–10,15–17). The effect size for each tobacco-control policy is applied as a relative reduction in smoking prevalence. To incorporate the ability of a tobacco-control policy (with the exception of price policies) to affect health awareness, policy effect sizes are multiplied by an awareness adjustor (> 1) for LMICs and a value of 1 (no adjustment) for HICs. An additional adjustment is applied to smoking-cessation services and smoke-free policies to reflect the reduced ability to influence non-urban populations, measured as one minus the percentage of people employed in agriculture. Finally, an adjustment is made to reflect medium-term and long-term policy.

Based on the complete SimSmoke model, a short-term (at five years), medium-term (at 15 years) and long-term (at 40 years) multiplier is estimated for each policy as the relative change in prevalence (for instance, after 15 or 40 years) divided by the relative change in short-term prevalence (after five years). MPOWER measures are described and their effect sizes listed in Table 1. Due to the lack of systematic reviews of the effect of policies, we do not provide confidence intervals. We instead provide upper and lower bound ranges for sensitivity analysis, based on the range of results in the better evaluation studies for each policy (9–11). The effect of fully implementing tobacco control policies in line with the WHO FCTC depends on the initial implementation level of these policies.

Abridged SimSmoke distinguishes smoke-free laws applying to worksites, restaurants, bars and other indoor public places. Worksite bans are further classified by bans in all indoor workplaces; indoor offices only; and three of the following four: healthcare facilities, education facilities, universities, and government facilities. The effects are reduced by 50% in the absence of publicity (based on tobacco-control campaign expenditures) and complete enforcement (index = 1 to 10, with 10 = complete enforcement).

Smoking-cessation policies include pharmacotherapy availability, financial coverage of cessation support, and the availability of telephone quitlines. Pharmacotherapy availability evaluates the availability and accessibility of nicotine-replacement treatment (NRT), bupropion and varenicline (with or without a prescription). Financial coverage identifies specific locations in which cessation services are offered: primary care facilities, hospitals, health professionals' offices, communities, and other locations.

Four levels of health warnings on cigarette packages are considered: none; weak (covers less than 30% of principal display area of the pack); moderate (covers at least 30% of principal display area and meets at least one of the seven WHO GTCR 2015 criteria) (13); and strong (covers at least 50% of principal display area, includes all seven criteria). Mass media campaigns based on tobacco-control expenditures, which are also addressed in the WHO GTCR 2015 (13), represent an additional education policy option. Abridged SimSmoke includes three levels: low-level mass media campaigning, in which expenditure on the campaign is < US$ 0.05 per capita; moderate, if > US$ 0.05 but < US$ 0.50 per capita; and high, if > US$ 0.50 per capita.

Abridged SimSmoke classifies bans on tobacco advertising, promotion, and sponsorship as none; minimal (ban on at least two of television, radio and print advertising); moderate (ban on newspaper, television, radio and print advertising, and at least one type of promotion or sponsorship); and comprehensive (all direct and indirect advertising). Lack of enforcement reduces the impact of marketing restrictions by as much as 50%.

Cigarette taxation directly affects the cigarette price, which subsequently influences cigarette use. Taxes are evaluated as a percentage of the retail price of cigarettes. Consistent with MPOWER measures, Abridged SimSmoke considers the effect of increasing excise taxes (including ad valorem taxes and/or specific (per unit) taxes directly on cigarettes) to 75% of the price. The change in excise tax is first converted into an implied percentage

Table 1. *Tobacco-control policies, their specifications and effect sizes used in Abridged SimSmoke*

Tobacco-control policy specification	Description used in the model	Specification in WHO GTCR 2015	Effect size (% effect)[a]	Ranges for sensitivity analysis[a]	Long-term multiplier[a]	Awareness adjustor[b]	Urban adjustor[c]
Protect people from tobacco smoke							
Ban in all indoor workplaces	Ban in all indoor offices and workplaces	Yes/no	6.0%	(–50%, +50%)	1.4	1.5	Yes
Ban in indoor offices only	Ban except in ventilated workplaces	Not distinguished	4.0%	(–50%, +50%)	1.4	1.5	Yes
Ban in healthcare facilities, education facilities, universities or government facilities (at least three of four)	Ban in work areas only	Yes/no	2.0%	(–50%, +50%)	1.4	1.5	Yes
Ban in restaurants	Ban in all indoor areas of a restaurant	Yes/no	2.0%	(–50%, +50%)	14	1.5	Yes
Ban in cafés, pubs and bars	Ban in all indoor areas of a café, pub or bar	Yes/no	1.0%	(–50%, +50%)	1.4	1.5	Yes
Enforcement	> 8: high compliance; 5–7; medium compliance; < 5 low compliance	Compliance score: 0–10	25% of effect depends on % enforcement (of 10)	NA	NA	NA	NA
Publicity	Based on level of tobacco-control campaign funding	NA	25% of above effect depends on publicity	NA	NA	NA	NA
Offer help to quit tobacco use							
Nicotine replacement therapy (NRT)	Designates if sold by pharmacy or general store and if prescription is required	NRT can be purchased in general store or pharmacy (with or without prescription)	If available, prevalence reduced by 0.667% (without prescription) or by 0.334% (with prescription)	(–75%, +75%)	2.5	1.5	Yes
Bupropion and varenicline	Designates if sold by pharmacy or general store with prescription	Bupropion and varenicline can be purchased in general store or pharmacy (with prescription)	If available, prevalence reduced by 0.334%	(–75%, +75%)	2.5	1.5	Yes
Provision of treatments	0 = none; 1 = yes, in some facilities; 2 = yes, in most facilities	Smoking-cessation support available in primary care facilities, hospitals, health professionals' offices, communities and other (yes/no)	If provided in most facilities, prevalence reduced by 2.25%	(–75%, +75%)	2.5	1.5	Yes
Quit-line type	Operating active national quit line	Yes/no	Prevalence reduced by 0.5%	(–75%, +75%)	2.5	1.5	Yes
Warn about the dangers of tobacco							
Health warnings on cigarette packages							
Weak	Small warnings that cover < 30% of package	Implementation score = 2	0.50%	(–50%, +50%)	3	2	No
Moderate	Warnings that cover 30–49% of package	Implementation score = 3	0.75%	(–50%, +50%)	3	2	No

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Tobacco-control policy specification	Description used in the model	Specification in WHO GTCR 2015	Effect size (% effect)[a]	Ranges for sensitivity analysis[a]	Long-term multiplier[a]	Awareness adjustor[b]	Urban adjustor[c]
Strong	Bold and graphic with rotating warnings and covers at least 50% of both sides of package	Implementation score = 4	1.0%	(–50%, +50%)	3	2	No
Tobacco-control, including mass media campaign, funding							
Low funded	National budget for tobacco control activities is < US$ 0.05 per capita and availability national agency for tobacco control	Anti-tobacco mass media campaign (yes/no); available budget	1.0% reduction	(–50%, +50%)	1.2	1	No
Moderately funded	National budget for tobacco control activities is > US$ 0.05 and < US$ 0.50 per capita and availability national agency for tobacco control	Anti-tobacco mass media campaign (yes/no); available budget	3.5 % reduction	(–50%, +50%)	1.2	1	No
Well funded	National budget for tobacco control activities > US$ 0.50 per capita and mass media campaign	Anti-tobacco mass media campaign (yes/no); available budget	6.5% reduction	(–50%, +50%)	1.2	1	No
Enforce bans on tobacco advertising, promotion and sponsorship							
Minimal	Ban on at least two of three: television, radio and print advertising	Implementation score = 2	1.0%	(–50%, +50%)	1.3	2	No
Moderate	Ban on newspaper, television, radio and print advertising and at least one type of promotion or sponsorship	Implementation score = 3	3.0%	(–50%, +50%)	1.3	2	No
Comprehensive restrictions	Ban on all forms of direct and indirect advertising	Implementation score = 4	5.0%	(–50%, +50%)	1.3	2	No
Enforcement	> 8: high compliance; 5–7: medium compliance; <5: low compliance	Compliance score: 0–10	50% of effect depends on enforcement	NA	NA	NA	NA
Raise taxes on tobacco							
Excise tax as a percentage of retail price of cigarettes	Sum of specific excise and ad valorem excise tax; uses arc elasticity formula	Specific and ad valorem excise tax as a percentage of retail price	Based on price elasticities, –0.15 for HICsg and –0.2 for MICsh and LICsi	(–25%, +25%)	2	No	No

GTCR − WHO report on the global tobacco epidemic (13); HIC − high-income country; LIC − low-income country; MIC − middle-income country; NA − not applicable; NRT − nicotine replacement therapy; WHO − World Health Organization

[a]Short-term effect size is defined as the relative percentage change in smoking prevalence in the first five years of policy implementation. The long-term effect is the short-term effect multiplied by the long-term multiplier, adjusted by awareness and urban status adjustors. Ranges for the effect sizes are also provided, which are measured as percentage variation in the effect sizes compared to the level in the preceding column.

[b]Awareness adjustor is multiplied by the effect size for low-income and middle-income countries.

[c]Urban adjustor reduces the effect to reflect the percentage of the rural population less affected by the policies indicated.

change in price, then the prevalence elasticity is applied to the percentage change in price to project the relative reduction in smoking prevalence.

Abridged SimSmoke provides projections for the effects of individual and combined policies. When modelling the combined effect of policies, the model allows effect sizes to be reduced proportionally for each additional policy in a multiplicative fashion, thereby implying some duplicative effect of policies and bounding the overall combined effect. Synergies between policies – mass media campaigns, smoke-free laws, and smoking-cessation services – are nevertheless built into the model.

Data

Individual Abridged SimSmoke models were built for the 11 middle- and high-income NIS countries: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, the Russian Federation, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan. Based on World Bank classifications, the Russian Federation was classified as a high-income country and the other 10 as middle-income. Population-size data for 2015 were derived from the United Nations (18). The World Factbook (19) provided data on the percentage of the population employed in agriculture and the unemployment rate. Country-level data on adult smoking prevalence was based on the most recent nationally representative survey that covered a wide age range (20–25). Country-level data on current tobacco-control policies were derived from the WHO GTCR 2015 (13) and the Tobacco Control Database for the WHO European Region (26). Data used in country-specific models are presented in Table 2 and the policy levels in Table 3.

RESULTS

Smokers and Smoking-Attributable Deaths

Table 4 shows the number of smokers and (premature) smoking-attributable deaths of the smokers alive today under current policies. The number of current smokers ranges from 368,200 in Turkmenistan to more than 38.2 million in the Russian Federation. Ukraine has the second highest and Uzbekistan the third highest number of smokers (about 10.6 million and almost 2.9 million, respectively). The number of female smokers (range: 8,100–9,982,000) is lower than that for males (range: 356,500–28,249,000) in all countries. Premature deaths are projected to be as high as 19.8–30.4 million of the 60.8 million smokers alive today in the 11 countries. The number of premature deaths varies from 184,100 to 19,115,500, based on relative risks for high-income countries, and from 119,665 to 12,425,075, based on middle-income countries' risks.

The effects of stronger tobacco control measures consistent with WHO FCTC on short-, mid- and long-term smoking prevalence and long-term effects on the number of smokers and smoking-attributable deaths are presented in Table 5.

With more comprehensive smoke-free laws covering all indoor public spaces and complete enforcement, the model projects relative reductions in smoking prevalence from 0.9% in the Russian Federation to 15.5% in Belarus within 15 years. Within 40 years, 881,000–1.4 million smoking-attributable deaths could be averted in total, with the greatest impact projected for Ukraine and the Russian Federation, followed by Uzbekistan, Belarus, and Kazakhstan.

Increasing from minimal provision to a well-publicised and comprehensive smoking-cessation service yields a relative reduction in smoking prevalence of 2.3% in Turkmenistan and up to 5.6% in Ukraine within 15 years. Within 40 years, 1.3–1.9 million smoking-attributable deaths could be averted in total, with the greatest impact projected for the Russian Federation, Ukraine, Belarus, Uzbekistan, and Kazakhstan.

Requirements for strong, graphic health warnings on cigarette packages are projected to reduce smoking prevalence by at least 6% within 15 years in all countries, except Turkmenistan and Ukraine. Strengthening health warnings in these countries may not have any additional effects on the relative change in smoking prevalence, as the health-warning policy and its implementation are already at the highest level. Within 40 years, 1.4–2.2 million smoking-attributable deaths could be averted in total, with the greatest impact projected for the Russian Federation, Kazakhstan, Belarus, and Uzbekistan.

The model projects a relative reduction in smoking prevalence of 6.3% within 15 years in Armenia, Belarus, Kazakhstan, the Russian Federation, and Turkmenistan by increasing awareness of the harms of tobacco use through a high-level media campaign, and in all other countries by 7.5% from low- to well-funded campaigns. Within 40 years, 1.4–2.1 million smoking-attributable deaths could be averted in total, with the greatest impact projected for the Russian Federation, Ukraine, Uzbekistan, and Kazakhstan.

A comprehensive ban on advertising, promotion and sponsorship that includes strong enforcement is projected to yield a relative reduction in smoking prevalence from 0.3% in the Russian Federation to 12% in Georgia within 15 years. Within 40 years, 539,000–830,000 smoking-attributable deaths would be averted in total, with the greatest impact projected for Ukraine and Kazakhstan.

An increase in excise cigarette taxes has the largest effect for all countries. By increasing the excise tax to 75%, the model projects a relative reduction in smoking prevalence within 15 years from 18.1% in Ukraine to 33% in Azerbaijan. Within 40 years, 6.9–10.6 million smoking-attributable deaths could be averted in total, with the greatest impact projected for the Russian Federation, Ukraine, Uzbekistan, and Kazakhstan.

Potential Effect for Combined Policies

For the combined effect of all tobacco control policies on smoking prevalence, the model projects a relative reduction for all countries of at least 28.5% within five years, at least 39.1% within 15 years, and at least 46% within 40 years. Within 40 years, 10.1–15.6 million smoking-attributable deaths could be averted in total, with the greatest impact projected for the Russian Federation, Ukraine, Uzbekistan, Kazakhstan, and Belarus.

DISCUSSION

Similar to the original SimSmoke model, Abridged SimSmoke may be used for strategic planning and advocacy purposes (27). The model has two objectives: to show the number of smoking-

Table 2. *Data used in Abridged SimSmoke country-specific models*

Country	Income status	Population size (15 years and older) (19)	Population employed in agriculture (%) (20)	Unemployment rate (%) (20)	Smoking prevalence source/survey year	Male smoking prevalence (%)	Female smoking prevalence (%)
Armenia	Middle	2,370,000	39.0	17.3	Prevalence – most recent adult survey data by country. In: Global Health Observatory (GHO) data repository (European Region) (21)	50.9	3.2
Azerbaijan	Middle	7,500,000	38.3	6.0	Prevalence – most recent adult survey data by country. In: GHO data repository (European Region) (21)	35.3	0.0
Belarus	Middle	7,640,000	9.3	1.0	Prevalence – most recent adult survey data by country. In: GHO data repository (European Region) (21)	48.6	9.7
Georgia	Middle	3,200,000	55.6	15.0	WHO STEPwise approach to Surveillance (STEPS) / 2010 (22)	55.5	4.8
Kazakhstan	Middle	12,700,000	25.8	5.3	Global Adult Tobacco Survey/2014 (23)	42.4	4.5
Kyrgyzstan	Middle	1,679,000	48.0	8.6	Prevalence – most recent adult survey data by country. In: GHO data repository (European Region) (21)	48.2	2.7
Russian Federation	High	115,000,000	9.4	5.8	Prevalence – most recent adult survey data by country. In: GHO data repository (European Region) (21)	53.3	16.1
Tajikistan	Middle	5,400,000	46.5	2.5	The practice of cigarette consumption and use of smokeless tobacco in the Republic of Tajikistan/2015 (24); Demographic and health survey/2013 (25)	17.0	0.3
Turkmenistan	Middle	4,250,000	48.2	11.0	Prevalence – most recent adult survey data by country. In: GHO data repository (European Region) (21)	15.5	0.6
Ukraine	Middle	36,600,000	5.8	8.0	Prevalence – most recent adult survey data by country. In: GHO data repository (European Region) (21)	48.0	12.8
Uzbekistan	Middle	21,000,000	25.9	4.9	WHO STEPwise approach to Surveillance (STEPS)/2014 (26)	26.8	1.4

Table 3. *Initial implementation level of tobacco-control policies on which the Abridged SimSmoke country-specific models were based, by country*

Countries	Protect people from tobacco smoke	Offer help to quit tobacco use	Warn about the dangers of tobacco		Enforce bans on tobacco advertising, promotion and sponsorship	Raise taxes on tobacco
			Health warnings	Mass media campaign		VAT/excise tax (%)
Armenia	Health-care facilities and education facilities, including universities, are completely smoke-free	Provision of cessation support in some health clinics or other primary care facilities; NRT can be purchased over the counter in a pharmacy but is not cost-covered; toll-free quit line is unavailable	Weak	Moderately funded	Moderate	16.67/16.67
Azerbaijan	Health-care facilities and education facilities, including universities, are completely smoke-free	Smoking-cessation services are not available; NRT can be purchased over the counter in a pharmacy but is not cost-covered; toll-free quit line is unavailable	Weak	Low funded	Moderate	15.25/2.02
Belarus	No public places are completely smoke-free	Provision of cessation support in some health clinics or other primary care facilities; NRT can be purchased over the counter in a pharmacy but is not cost-covered; toll-free quit line is unavailable	Weak	Well-funded	Moderate	16.67/34.48
Georgia	Health-care facilities and education facilities, including universities, are completely smoke-free	Provision of cessation support in some health clinics or other primary care facilities; NRT is not available, but varenicline can be purchased over the counter in a pharmacy but is not cost-covered; toll-free quit line is available	Weak	Low funded	Minimal	15.25 /34.09
Kazakhstan	Health-care facilities and education facilities (including universities), government facilities, indoor offices and workplaces, cafes, pubs and bars, are completely smoke-free	Provision of cessation support in some health clinics or other primary care facilities; NRT can be purchased over the counter in a pharmacy but is not cost-covered; toll-free quit line is available	Moderate	Well-funded	Moderate	10.71/28.57
Kyrgyzstan	Health-care facilities, education facilities (including universities) and government facilities are completely smoke-free	Provision of cessation support in some health clinics or other primary care facilities; NRT is not available, but varenicline can be purchased over the counter in a pharmacy but is not cost-covered; toll-free quit line is available	Moderate	Low funded	Moderate	10.71/24.0
Russian Federation	All enclosed public places are completely smoke-free	Provision of cessation support in some health clinics or other primary care facilities; NRT can be purchased over the counter in a pharmacy but is not cost-covered; toll-free quit line is available	Moderate	Well-funded	Comprehensive	15.25/32.38
Tajikistan	No public places are completely smoke-free	Smoking-cessation services and a toll-free quit line are not available; NRT is available	NA	Low funded	Moderate	15.25/2.66
Turkmenistan	All enclosed public places are completely smoke-free	Provision of cessation support in some health clinics or other primary care facilities; NRT can be purchased over the counter in a pharmacy but is not cost-covered; toll-free quit line is available	Strong	Well-funded	Moderate	13.04/12.23
Ukraine	Almost all enclosed public places are completely smoke-free	Provision of cessation support in some health clinics or other primary care facilities; NRT can be purchased over the counter in a pharmacy but is not cost-covered; toll-free quit line is unavailable	Strong	Low funded	Moderate	16.67/58.11
Uzbekistan	Public transport is completely smoke-free	Provision of cessation support in some health clinics or other primary care facilities; NRT can be purchased over the counter in a pharmacy but is not cost-covered; toll-free quit line is unavailable	Moderate	NA	Moderate	16.67/15.86

Data were adapted from the WHO report on the global tobacco epidemic 2015 (13) and the tobacco-control database for the WHO European Region (26).
NA − not applicable; NRT − nicotine replacement therapy; VAT − value-added tax

Table 4. *Initial number of smokers and projected premature smoking-attributable deaths, by country*

Country	Initial number of smokers (n)			Projected premature smoking-attributable deaths of current smokers (n)			
	Male	Female	Total	Male[a]	Female[a]	Total[a]	Total[b]
Armenia	549,720	41,280	591,000	274,860	20,640	295,500	192,075
Azerbaijan	1,306,100	–	1,306,100	653,050	–	653,050	424,483
Belarus	1,725,300	396,730	2,122,030	862,650	198,365	1,061,015	689,660
Georgia	834,000	81,600	915,600	417,000	40,800	457,800	297,570
Kazakhstan	2,544,000	301,500	2,845,500	1,272,000	150,750	1,422,750	924,788
Kyrgyzstan	402,952	22,761	425,713	201,476	11,381	212,857	138,357
Russian Federation	28,249,000	9,982,000	38,231,000	14,124,500	4,991,000	19,115,500	12,425,075
Tajikistan	459,000	8,100	467,100	229,500	4,050	233,550	151,808
Turkmenistan	356,500	11,700	368,200	178,250	5,850	184,100	119,665
Ukraine	8,112,000	2,521,600	10,633,600	4,056,000	1,260,800	5,316,800	3,455,920
Uzbekistan	2,733,600	151,200	2,884,800	1,366,800	75,600	1,442,400	937,560
Total	47,272,172	13,518,471	60,790,643	23,636,086	6,759,236	30,395,322	19,756,961

[a]Premature deaths are based on relative risks from large-scale studies of high-income countries.
[b]Premature deaths are based on relative risks from large-scale studies of low-income and middle-income countries.

Table 5. *Effect of stronger tobacco-control policies (individual and combined) on initial smoking prevalence and smoking-attributable deaths among adults, by country*

Country	Relative reduction in smoking prevalence – both sexes (%)			Reduction in smoking-attributable deaths in 40 years (n)			
	5 years	15 years	40 years	Male[a]	Female[a]	Total[a]	Total[b]
Protect people from tobacco smoke							
Armenia	6.5	7.5	8.2	22,502	1,690	24,192	15,725
Azerbaijan	7.8	9.0	9.8	63,882	–	63,882	41,524
Belarus	13.5	15.5	16.9	145,663	33,495	179,158	116,453
Georgia	5.4	6.2	6.8	28,271	2,766	31,037	20,174
Kazakhstan	5.5	6.3	6.8	87,087	10,321	97,408	63,315
Kyrgyzstan	6.4	7.4	8.0	16,162	913	17,074	11,098
Russian Federation	0.8	0.9	1.0	139,114	49,157	188,271	122,376
Tajikistan	7.7	8.9	9.6	22,083	390	22,473	14,607
Turkmenistan	1.1	1.2	1.3	2,355	77	2,432	1,581
Ukraine	8.2	9.5	10.3	417,871	129,894	547,765	356,047
Uzbekistan	10.1	11.6	12.6	171,736	9,499	181,235	117,803
Offer help to quit tobacco use							
Armenia	1.8	3.2	4.6	12,696	953	13,649	8,872
Azerbaijan	2.1	3.6	5.1	63,882	–	63,882	41,524
Belarus	3.1	5.4	7.7	66,098	15,199	81,297	52,843
Georgia	1.8	3.2	4.5	18,872	1,847	20,719	13,467
Kazakhstan	1.9	3.3	4.8	60,812	7,207	68,019	44,212
Kyrgyzstan	2.1	3.7	5.3	10,679	603	11,282	7,333
Russian Federation	2.4	4.2	5.9	838,163	296,171	1,134,335	737,318
Tajikistan	2.5	4.4	6.3	14,359	253	14,612	9,498
Turkmenistan	1.3	2.3	3.3	5,949	195	6,144	3,994
Ukraine	3.2	5.6	8.0	324,563	100,890	425,453	276,544
Uzbekistan	2.5	4.3	6.2	84,792	4,690	89,482	58,163

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Country	Relative reduction in smoking prevalence – both sexes (%)			Reduction in smoking-attributable deaths in 40 years (n)			
	5 years	15 years	40 years	Male[a]	Female[a]	Total[a]	Total[b]
Warn about the dangers of tobacco							
Health warnings on cigarette packages							
Armenia	6.0	9.0	12.0	32,983	2,477	35,460	23,049
Azerbaijan	6.0	9.0	12.0	78,366	–	78,366	50,938
Belarus	6.0	9.0	12.0	103,518	23,804	127,322	82,759
Georgia	6.0	9.0	12.0	50,040	4,896	54,936	35,708
Kazakhstan	6.0	9.0	12.0	152,640	18,090	170,730	110,975
Kyrgyzstan	4.5	6.8	9.0	18,133	1,024	19,157	12,452
Russian Federation	4.0	6.0	8.0	1,129,960	399,280	1,529,240	994,006
Tajikistan	7.5	11.3	15.0	34,425	608	35,033	22,771
Turkmenistan	0.0	0.0	0.0	–	–	–	–
Ukraine	0.0	0.0	0.0	–	–	–	–
Uzbekistan	4.5	6.8	9.0	123,012	6,804	129,816	84,380
Available tobacco-control, including mass media campaign, funding							
Armenia	5.5	6.3	6.6	18,141	1,362	19,503	12,677
Azerbaijan	6.5	7.5	7.8	50,938	–	50,938	33,110
Belarus	5.5	6.3	6.6	56,935	13,092	70,027	45,518
Georgia	6.5	7.5	7.8	32,526	3,182	35,708	23,210
Kazakhstan	5.5	6.3	6.6	83,952	9,950	93,902	61,036
Kyrgyzstan	6.5	7.5	7.8	15,715	888	16,603	10,792
Russian Federation	5.5	6.3	6.6	932,217	329,406	1,261,623	820,055
Tajikistan	6.5	7.5	7.8	14,359	253	14,612	9,498
Turkmenistan	5.5	6.3	6.6	11,765	386	12,151	7,898
Ukraine	6.5	7.5	7.8	316,368	98,342	414,710	269,562
Uzbekistan	6.5	7.5	7.8	106,610	5,897	112,507	73,130
Enforce bans on tobacco advertising, promotion and sponsorship							
Armenia	9.2	11.0	11.9	32,695	2,455	35,150	22,847
Azerbaijan	4.6	5.5	6.0	39,052	–	39,052	25,384
Belarus	4.9	5.9	6.4	54,951	12,636	67,587	43,931
Georgia	10.0	12.0	13.0	54,210	5,304	59,514	38,684
Kazakhstan	5.5	6.6	7.2	90,948	10,779	101,727	66,122
Kyrgyzstan	5.5	6.6	7.2	14,406	814	15,219	9,893
Russian Federation	0.3	0.3	0.3	45,905	16,221	62,125	40,381
Tajikistan	4.6	5.5	6.0	13,724	242	13,966	9,078
Turkmenistan	4.3	5.2	5.6	9,964	327	10,291	6,689
Ukraine	4.9	5.9	6.4	258,367	80,313	338,680	220,142
Uzbekistan	4.6	5.5	6.0	81,735	4,521	86,256	56,066
Raise taxes on tobacco							
Armenia	21.0	31.5	42.0	115,444	8,669	124,113	80,674
Azerbaijan	22.0	33.0	44.0	287,082	–	287,082	186,603
Belarus	18.6	27.8	37.1	320,115	73,610	393,725	255,921
Georgia	18.2	27.3	36.3	151,554	14,828	166,382	108,148
Kazakhstan	17.7	26.5	35.4	449,752	53,302	503,054	326,985

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Country	Relative reduction in smoking prevalence – both sexes (%)			Reduction in smoking-attributable deaths in 40 years (n)			
	5 years	15 years	40 years	Male[a]	Female[a]	Total[a]	Total[b]
Kyrgyzstan	18.2	27.3	36.4	73,959	4,178	78,137	50,789
Russian Federation	18.5	27.7	36.9	5,215,889	1,843,074	7,058,963	4,588,326
Tajikistan	21.2	31.8	42.5	13,724	242	13,966	9,078
Turkmenistan	20.4	30.7	40.9	72,903	2,393	75,296	48,942
Ukraine	12.1	18.1	24.2	981,313	305,039	1,286,352	836,129
Uzbekistan	21.1	31.6	42.2	576,440	31,884	608,324	395,411
Combined policies							
Armenia	41.5	53.5	63.2	173,765	13,049	186,814	121,429
Azerbaijan	40.9	53.2	63.4	414,095	–	414,095	269,162
Belarus	42.3	53.7	63.9	542,224	124,683	666,907	433,490
Georgia	39.9	51.1	60.0	250,234	24,483	274,718	178,567
Kazakhstan	35.9	47.0	56.2	715,406	84,786	800,192	520,125
Kyrgyzstan	36.8	47.8	56.9	114,948	6,493	121,441	78,937
Russian Federation	28.5	39.7	49.7	7,017,857	2,479,813	9,497,670	6,173,486
Tajikistan	41.5	53.9	64.1	147,059	2,595	149,655	97,275
Turkmenistan	29.8	40.6	50.3	89,643	2,942	92,585	60,180
Ukraine	30.6	39.1	46.0	1,865,691	579,947	2,445,638	1,589,665
Uzbekistan	41.0	52.9	62.6	855,484	47,318	902,802	586,822

[a]Smoking-attributable deaths are based on relative risks from large-scale studies of high-income countries.
[b]Smoking-attributable deaths are based on relative risks from large-scale studies of low-income and middle-income countries.

attributable deaths among smokers alive today and to show the effect of policies individually and in combination on smoking prevalence and smoking-attributable deaths.

The results of the projections from Abridged SimSmoke show the need for stronger tobacco control policies consistent with the WHO FCTC. With current tobacco control measures unchanged, a large number of smoking-attributable deaths (range: 19.8–30.4 million) can be expected just among the smokers alive today. If all MPOWER measures were soon to be implemented fully, the 11 NIS countries could potentially achieve the United Nations Sustainable Development Goal global target of a 30% relative reduction in smoking prevalence by 2030. The Russian Federation and Turkmenistan would have the potential to reach this target within the next 10 years, and all other countries within the next five. Full implementation of the tobacco control measures is also projected to avert 10.1–15.6 million deaths within 40 years in all 11 countries.

The largest immediate and long-term gains are projected from increasing taxes to 75% of retail price. None of the selected countries tax at 75% of retail price. While the largest potential health effect can be achieved through taxation, the other tobacco control measures also play an important role. For instance, smoke-free laws have been implemented to a limited extent in most countries with relatively low compliance; coverage can be expanded and enforcement of these laws can be improved. Only four countries out of eleven had high-level mass-media campaigns. Anti-tobacco mass media campaigns not only play an important role in educating smokers about the benefits of cessation, but also help to increase compliance with smoke-free laws by educating the public about the dangers of exposure to second-hand smoke. Smoking cessation policies are very limited in the selected countries. Smoking-cessation services, especially when publicised by media campaigns, are important for quit success, while other measures primarily increase quit attempts. Marketing restrictions are also limited and can be easily expanded and better enforced. They are particularly effective in reducing smoking initiation by adolescents and young adults (3, 4). Health warnings are weak in most countries, but play an important role in encouraging cessation.

Abridged SimSmoke has strengths. It is based on the complete SimSmoke model, in which policy effects are based on literature reviews (5), advice from expert panels and validation studies (7–10,15–17). In addition, the results of the Abridged model have also been compared to results from the complete SimSmoke for selected nations and was found to replicate projections for the effect of individual and combined policies. Nevertheless, the model projections are subject to limitations.

First, the model does not incorporate likely future changes in smoking prevalence that may reflect the effect of previously implemented tobacco control policies. Mass displacements, geopolitical changes, and economic recession could, however, lead to progression of the tobacco epidemic (28) and a likely increase in smoking-attributable deaths.

Second, the model does not include adolescents and young adults who may initiate smoking in future years (in the absence of strong policies), nor does it incorporate the benefits of newly implemented policies that reduce smoking initiation. In particular, smoking rates among women, which are currently low compared to males, may be expected to increase in the absence of stronger

policies. By excluding this possibility, our results may understate the effects of policies.

A third limitation is that the model does not reflect that those who quit later in life will have elevated risks as former smokers, thereby reducing some of the estimated health benefits from strong policies. In addition, the effects of second-hand tobacco smoke exposure are not considered.

Fourth, the model considers only cigarette-smoking and does not incorporate e-cigarettes, shisha (water pipe) or smokeless tobacco use. Smokeless tobacco and/or water pipe use is increasing. E-cigarette use is already present in some countries and may be expected to increase, particularly in those with upper-middle incomes. Tobacco control policies, including taxation, may need to be applied to alternative nicotine-delivery products.

Finally, the model includes tobacco control policy data that are restricted to a specific set of policies and definitions, mainly focusing on demand-reducing interventions. Other measures, such as policies directed at price minimising, behaviour or enforcement against smuggling, use of plain packaging, youth access, and product-content regulation, may also be employed to reduce tobacco use.

CONCLUSION

While subject to limitations, the projections from Abridged SimSmoke show that large potential health effects can be achieved in NIS countries, thereby providing strong justifications for implementing stronger tobacco control policies and accelerating the enforcement of tobacco control laws. The model also ranks the effects of the different policies. The results show the particularly strong effect of tax policies, but that greater coverage and better enforcement of smoke-free air laws, stronger graphic warnings and media campaigns, more comprehensive cessation treatment and broader coverage, and better-enforced marketing restrictions also play an important role. In addition to implementing these measures, better surveillance and evaluation of tobacco control policies are needed to ensure their effective enforcement (27).

Disclaimer

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Conflicts of Interests

None declared

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