Knowledge of the health impacts of smoking and public attitudes towards tobacco control in the former Soviet Union

Bayard Roberts[1], **Andrew Stickley**[1,2,3], **Anna Gilmore**[4], **Kirill Danishevski**[5], **Kseniya Kizilova**[6], **Anna Bryden**[1], **David Rotman**[7], **Christian Haerpfer**[8], and **Martin McKee**[1]

[1]European Centre on Health of Societies in Transition, London School of Hygiene and Tropical Medicine, United Kingdom

[2]Stockholm Centre on Health of Societies in Transition, Södertörn University, Sweden

[3]Department of Global Health Policy, Graduate School of Medicine, University of Tokyo, Japan

[4]Department for Health, University of Bath, United Kingdom

[5]Open Health Institute, Moscow, Russia

[6]East-Ukrainian Foundation for Social Research, Kharkiv, Ukraine

[7]The Center for Sociological and Political Research, Belarussian State University, Belarus

[8]School of Social Science, Aberdeen University, United Kingdom

Abstract

Aim—To describe levels of knowledge on the harmful effects of tobacco and public support for tobacco control measures in nine countries of the former Soviet Union, and to examine the characteristics associated with this knowledge and support.

Methods—Standardised cross-sectional, nationally representative surveys conducted in 2010/11 with 18000 men and women aged 18 years and above in Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, and Ukraine. Respondents were asked a range of questions on their knowledge of the health effects of tobacco and their support for a variety of tobacco control measures. Descriptive analysis was conducted on levels of knowledge and support, along with multivariate logistic regression analysis of characteristics associated with overall knowledge and support scores.

Results—Large gaps exist in public understanding of the negative health effects of tobacco use, particularly in Azerbaijan, Kazakhstan, Kyrgyzstan, and Moldova. There are also extremely high levels of misunderstanding about the potential effects of 'light' cigarettes. However, there is popular support for tobacco control measures. Over three quarters of the respondents felt that their governments could be more effective in pursuing tobacco control. Higher levels of education, social capital (membership of an organisation) and being a former or never smoker were associated with higher knowledge on the health effects of tobacco and/or being more supportive of tobacco control measures.

Conclusions—Increasing public awareness of tobacco's health effects is essential for informed decision-making by individuals and for further increasing public support for tobacco control measures.

Keywords

BACKGROUND

Rates of smoking in the countries of the former Soviet Union (fSU) are currently among the highest in the world.[1] Although the prevalence of smoking among men was high even in the Soviet era when cigarettes were cheap and readily available, overall smoking rates increased following the collapse of the communist system and the opening of the region's markets which heralded the arrival of the transnational tobacco companies and their aggressive marketing campaigns.[2, 3] The effects can be seen not only in the rising prevalence of smoking, particularly among women, but also in the earlier age of smoking initiation and the failure smoking rates among men to decline as would be expected based on patterns of the tobacco epidemic seen elsewhere.[4–6] These changes are a particular cause for concern as long-term high levels of smoking in this region have already given rise to the highest accumulated burden of tobacco-related disease among men under 75 years of in the world.[2, 7, 8]

The urgent necessity of reducing smoking rates in the fSU demands effective tobacco control measures including tax increases, restrictions on tobacco marketing, smoke free legislation, and effective warnings on tobacco product packaging.[1, 9] However, tobacco control was largely non-existent in the Soviet era, and in the decade after the collapse of the Soviet Union, the transnational tobacco companies actively obstructed progress in tobacco control.[10–12] Over the past five to ten years there has been some progress with all 9 countries that will be examined in this study either ratifying or acceding to the WHO Framework Convention on Tobacco Control (Web-only Material Table A).

However, effective policy development and implementation remains a major challenge.[1] Smoking bans vary across with the region, with smoking still allowed in pubs and bars in Azerbaijan, Belarus, Kyrgyzstan, Moldova and Russia, and still in restaurants in Kyrgyzstan, Moldova and Russia. Kyrgyzstan is particularly weak, with bans only in place in health and education facilities (Web-only Material Table A). The share of taxes in the retail price of cigarettes also remains low, generally between 20% and 30% (and just 18% in Kyrgyzstan), with the exception of Georgia and Ukraine which now have taxation rates of 61% and 70% respectively (Web-only Material Table A).[1, 13, 14] Consequently the price of cigarettes is also relatively low (Web-only Material Table A). The average price in 2010 for a pack of 20 cigarettes of the most popular brand was $1.62 (in international dollars at purchasing power parity) across the study countries which compares with an average price of $5.06 in European Union member states.[15]

Information on the public's knowledge of the harmful effects of tobacco use and their attitudes towards tobacco control measures is key to successful implementation of tobacco control policies and the subsequent reduction in smoking rates. Knowledge and risk-awareness of the health impacts of tobacco use are vital elements in securing behaviour change.[16–18] Public opinion can also encourage and sustain political support for and the successful implementation of tobacco control policies.[19]

Previous studies on individual countries in the region have indicated gaps in the public's knowledge of the health impacts of tobacco.[20, 21] However, no research has been undertaken simultaneously across a number of countries in this region using a common methodological framework that would allow comparative analyses to be conducted, or that has explored the characteristics associated with levels of knowledge on the harmful effects of tobacco and support for tobacco control in the region. The aim of this study is to describe levels of knowledge on the harmful effects of tobacco and public support for tobacco control measures in nine countries of the former Soviet Union, and to examine the characteristics associated with this knowledge and support. As noted above, such information can help inform and guide the development and implementation of tobacco control programmes.

METHODS

We use data from household surveys undertaken in Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, and Ukraine as part of the Health in Times of Transition (HITT) study (www.hitt-cis.net). These surveys used standardised questionnaires across the countries on a range of health outcomes, health behaviours, and demographic, socio-economic and environmental characteristics.

Nationally representative cross-sectional surveys using multi-stage sampling were conducted with adult respondents (aged   18 years). Within each primary sampling unit (about 100–200 per country), households were selected by random route procedures. Within each of the selected households one person was randomly chosen.

The surveys were conducted between March and May 2010, except in Kyrgyzstan where data were collected between March and May 2011 due to the political violence that occurred there in 2010. Face-to-face interviews were conducted by trained fieldworkers in the respondents' homes. Response rates varied from 47.3% in Kazakhstan to 83% in Moldova. There were 1800 respondents in each country, except in Russia (N=3000) and Ukraine (N=2200) where bigger samples were obtained to reflect their larger and more regionally diverse populations, and in Georgia (N=2200) where a booster survey of 400 additional interviews was undertaken in November 2010 to ensure a more representative sample.

All persons gave their informed consent prior to their inclusion in the study. The research was approved by the ethics committee of the London School of Hygiene and Tropical Medicine and was conducted in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki

The draft questionnaire was forward and backward translated into each of the languages in which it was administered, and then piloted before being finalised. Except in Russia and Belarus (where all of the interviews were conducted in Russian) respondents were given the choice of answering either in Russian or a national language.

Respondents' knowledge regarding the health effects of active and passive smoking were explored by asking them whether smoking can cause various health problems (lung cancer, cardiovascular disease, stroke, bronchitis, caries, impotence, infertility, with yes/no response options for each condition) and whether passive smoking influences health. Respondents were also asked whether so called 'light' or 'mild' cigarettes are less harmful to health.

There were four main questions on tobacco control issues. There was a general question asking 'how effective do you think the authorities are in fighting against smoking in our country?'. The response options were 'effective enough', 'they do something but could do more', and 'not effective'. This was followed by three separate questions which were more specific. The first question was 'do you think tobacco prices should…' with response

options of 'increase faster than the prices of other goods', 'increase in accordance with prices of other goods', and 'should not increase'. The second question was 'do you think that health warnings about the harm of tobacco on cigarette packets should...', with response options of 'be accompanied by corresponding pictures', 'should have larger text warnings', or 'stay the same'. The third question was 'should the smoking ban in restaurants/bars and cafes...', with five response options of 'be a total ban', 'provide equal smoking/non-smoking areas', 'provide small non-smoking areas', 'provide small areas for smokers', or that there should be 'no smoking ban in restaurants, bars and cafes'.

Analysis

We firstly describe the sample characteristics (Table 1) and then examine respondents' knowledge on the effects of smoking (Table 2) and their attitudes towards tobacco control (Table 3), by country. We also calculated summary scores for knowledge of the health effects of tobacco (Table 2; Web-only Material Figures A) and also for support for tobacco control activities (Table 3; Web-only Material Figures B). The summary knowledge score aggregated the total scores available for the 7 health knowledge questions on smoking as a cause of lung cancer, cardiovascular disease, stroke, bronchitis, caries, impotence, and infertility. This produced aggregate scores ranging from 0 (least knowledgeable) to 7 (most knowledgeable). The summary score for support for tobacco control activities was derived from the sum of scores allocated to the specific tobacco control elements of: (i) tobacco prices (with responses favouring an 'increase faster than the prices of other goods' scoring 1, and all other responses scoring 0); pictorial warnings on cigarette packages (with responses favouring pictures scoring 1 and those not doing so scoring 0), larger text warnings on cigarette packages (with responses favouring larger text warnings scoring 1 and those not doing so scoring 0); and smoking bans (with those favouring a total ban scoring 1 and all other responses scoring 0). This produced aggregate scores ranging from 0 (least supportive of tobacco control) to 4 (most supportive of tobacco control).

Logistic regression analysis was then used to explore the characteristics associated with a high knowledge on the health effects of tobacco (Table 4) and high support for tobacco control activities (Table 5). For the purposes of the logistic regression, the tobacco knowledge score was dichotomised into having a high knowledge (scores of 5–7, 21% of respondents) or low knowledge (scores of 0–4, 79% of respondents) of tobacco's health effects, while the tobacco control support outcome was the tobacco control support score dichotomised into having high support (scores of 3–4, 18% of respondents) or low support (scores of 0–2, 82% of respondents) for tobacco control. A range of putative explanatory variables were then selected and their relationship tested with the binary outcomes of high knowledge of tobacco health effects and high support for tobacco control. These explanatory variables included country (with Kyrgyzstan used as the reference country as it has the weakest tobacco control in the region (see Web-only Material Table 1)), gender, age, education level, living location (urban/rural), smoking status, self-reported household economic status (which had the response options of bad, very bad, average, good, and very good, which were subsequently grouped into 3 categories of bad/very bad, average, and good/very good), and a social capital related variable, membership of an organisation (not a member, member, and active member). The knowledge score on the health effects of tobacco was also included as an explanatory variable for the tobacco control support outcome and was categorised into 4 groups based upon an even distribution of responses producing score ranges of 0 to 2; 3; 4; and 5 to 7. We conducted bivariate and then multivariate analysis in order to adjust for the influence of the other variables. The regression analysis presented here was for all countries combined to ensure greater statistical power (but the same analyses for individual countries is also presented in Web-only Material Tables B and C). Statistical significance was set at P<0.05. Data were weighted to adjust for

the variation in country sample sizes and adjusted for the clustered nature of the survey design.

RESULTS

Of the 18000 respondents, there were more women than men in all of the study countries (Table 1), with Georgia having a particularly high female to male ratio (64/36) which is characteristic of recent household surveys undertaken there and due principally to large scale labour migration. In all of the countries there were considerably more male smokers than female smokers, with male smoking prevalence ranging from 39% (Moldova) to 59% (Armenia), and female prevalence ranging from 1% (Azerbaijan) to 16% (Russia) (for further details see [22]).

Respondents in Ukraine recorded the highest mean summary knowledge score (3.84 [95% CI 3.75; 3.92]) while those in Azerbaijan (2.29 [95% CI 2.23; 2.35]) and Georgia (2.89 [95% CI 2.82; 2.96) had the lowest (Table 2; Web-only Material Figure A). For the region as a whole, 89% of respondents knew that smoking can cause lung cancer (ranging from 78% in Armenia to 93% in Belarus, Georgia, Kyrgyzstan and Ukraine), 69% knew it can cause heart disease (ranging from 51% in Azerbaijan to 79% in Armenia), and 58% knew it can cause bronchitis (ranging from 43% in Azerbaijan and Georgia to 68% in Russia). Knowledge about tobacco as a contributory cause of stroke was lower, with around 38% of all respondents agreeing that it was a cause (varying from 11% in Azerbaijan to slightly above 50% in Armenia, Russia and Ukraine). It was lower still for conditions such as caries, impotence, and infertility (Table 2).

There was widespread understanding that passive smoking had a negative influence on health (Table 2), with only around 2% of respondents believing it had no influence on health (ranging from 1% in Belarus and Moldova to 4% in Armenia). However, only 60% of respondents in Armenia agreed that passive smoking was bad for the health of both adults and children. As many as 40–50% of current smokers in most of the countries believed that light cigarettes were less harmful to health.

Few respondents felt that existing measures taken by the authorities were effective (ranging from between 22% and 25% in Armenia, Georgia, Kazakhstan and Belarus to only around 9% in Kyrgyzstan, Moldova and Russia) (Table 3). Support for increasing the price of tobacco faster than other goods was highest in Moldova (55%) and lowest in Armenia (19%), with support in the other countries at around 30%. Support for expanding health warnings on cigarette packaging by adding pictures ranged from 43% in Kyrgyzstan to 22% in Armenia. Armenia had the highest number of respondents who felt that the cigarette packet warnings should stay as they currently are (48%). Attitudes towards smoking bans in restaurants, bars and cafes follow a similar pattern. Support for a total ban was lowest in Armenia (28%) and Georgia (30%) and highest in Moldova (56%). Support for at least partial smoking bans was consistently high across the study countries, with opposition to any kind of smoking ban in restaurants, bars and cafes just 2% in Moldova, 3% in Ukraine and 4% in Russia, but slightly higher in the South Caucasus countries of Armenia (7%), Azerbaijan (8%), and Georgia (10%). Respondents in Moldova had the highest mean summary score for being supportive of tobacco control activities (1.87 [95% CI 1.81; 1.93]) while those in Armenia (1.01 [95% CI 0.96; 1.06]) and Georgia (1.08 [95% CI 1.04; 1.12) had the lowest mean support scores (Table 3; Web-only Material Figure B).

The characteristics associated with a high knowledge of the harmful effects of tobacco are shown in Table 4. After adjustment for the influence of the other variables in the multivariate analysis, Compared to Kyrgyzstan, residents of Azerbaijan were less likely to

have high knowledge; residents of all other countries, except Georgia and Kazakhstan, were more likely to have high knowledge.. Other characteristics associated with high knowledge were being female, 60 years or older, having completed vocational or some higher education, being an active member of an organisation and being a former or never smoker.

The characteristics associated with supporting tobacco control are presented in Table 5. After adjustment, respondents in all the countries were less likely to support tobacco control than those in Kyrgyzstan, except in Moldova where they were significantly more likely to support it (while Azerbaijan was not statistically different). Other characteristics associated with high support were being female, 60 years or older, membership of an organisation, higher knowledge of the health effects of tobacco use, and being a former or never smoker.

DISCUSSION

To the best of our knowledge, this is the first study on public attitudes to tobacco control using the same survey methods across a range of countries in the fSU. Existing studies have been limited to individual countries, and some have not undertaken statistical analysis to explore the characteristics associated with support for tobacco control or have not been nationally representative.[20, 21, 23, 24]

Our findings also highlight that large gaps exist in public understanding of the negative health effects of tobacco use. When compared to other recent nationally representative data, [20, 21] the findings on awareness of the harmful health effects of tobacco are broadly similar to those from the Global Adult Tobacco Survey (GATS) in Russia and Ukraine as regards awareness of tobacco causing lung cancer (91% in Russia, 95% in Ukraine) and heart attacks (71% in Russia, 83% in Ukraine), while knowledge of its role in bronchitis (77% in Russia, 81% in Ukraine) and stroke (67% in Russia, 81% in Ukraine) were higher than in our study.[20, 21]

There were also extremely high levels of misunderstanding about the potential effects of 'light' cigarettes. In several countries (Armenia, Azerbaijan and Kazakhstan) around half of all current smokers believed that light cigarettes were less harmful to health, while in all the other countries (with the exception of Russia) this figure exceeded 40%.

These findings highlight the need for large-scale public awareness campaigns on the harmful health effects of tobacco and need for strong tobacco control. The argument that smokers know the risk of their behaviour clearly does not apply. This was shown by the results from the multivariate regression analysis on tobacco knowledge which demonstrated that current smokers are significantly less likely to have a high knowledge score than former or never smokers. The regression analyses also showed how higher levels of education were associated with greater knowledge concerning the health effects of tobacco, a finding which seemingly accords with other studies on the relationship between education, health and mortality in the fSU.[25] Interestingly, the regression analyses also highlighted that almost all the countries had a higher probability of a high knowledge score compared with Kyrgyzstan which has the weakest tobacco control legislation (Table 4), but that these other countries (except Moldova) had a lower likelihood of public recognition of the need for more tobacco control when compared with Kyrgyzstan (Table 5).

The results show that there is popular support for tobacco control measures in the study countries. Between 75% and 91% of the respondents felt that their governments could be more effective in pursuing tobacco control, while over half of all respondents felt that the health warnings on cigarette packaging should either be enlarged or contain pictures. There was also widespread support for at least a partial smoking ban in restaurants, bars and cafes. However, there remains limited support so far for a total ban – which is required to

effectively reduce the harmful effects of tobacco smoke [1] – with Moldova the only country where more than half of the respondents supported a total ban.

Limitations

First, the study was limited to people aged 18 and over and so did not obtain information on the views of adolescents. Their perspectives are clearly important in terms of shaping future patterns of tobacco use and the debate over tobacco control and are of particular significance given both the intensive marketing targeted at younger people by transnational tobacco companies in this region. Second, the sample sizes in each country prevented the optimal use of regression analysis for individual countries due to limited statistical power. Third, the study did not explore more nuanced aspects of how well informed respondents were about the risks of smoking, such as how they appreciated the meaning, severity, and probabilities of developing tobacco-related diseases and how current smokers accepted the personal risks of smoking. Fourth, it did not include attitudes towards aspects of tobacco control such as advertising due to restrictions on space in the questionnaire. Fifth, response rates were low in a number of countries, and this is consistent with survey response rates declining over the past decade in this region. Lastly, the descriptive results in this paper do not distinguish respondents by smoking status (except for knowledge of light cigarettes which was restricted to current smokers only), but the regression analysis does show the influence of smoking status on overall tobacco knowledge and support for tobacco control (and also has the advantage of controlling for the influence of other characteristics).

CONCLUSIONS

The findings from this study indicate that there are wide levels of general support for the implementation of tobacco control measures in the countries of the fSU but that substantial gaps remain in the public's knowledge concerning the harmful health effects of tobacco. Increasing public awareness of these harmful health effects is essential for informed decision-making by individuals and further increasing public support for tobacco control measures.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

References

1. World Health Organisation. WHO report on the global tobacco epidemic, 2011: warning about the dangers of tobacco. Geneva: World Health Organisation; 2011.

2. Peto, R.; Lopez, AD.; Boreham, J., et al. Mortality from smoking in developed countries 1950–2000: indirect estimates from national vital statistics. Oxford: Oxford University Press; 1994.

3. Gilmore AB, McKee M. Tobacco and transition: an overview of industry investments, impact and influence in the former Soviet Union. Tob Control. 2004; 13:136–42. [PubMed: 15175530]

4. Perlman F, Bobak M, Gilmore A, et al. Trends in the prevalence of smoking in Russia during the transition to a market economy. Tob Control. 2007; 16:299–305. [PubMed: 17897987]

5. Andreeva TI, Krasovsky KS. Changes in smoking prevalence in Ukraine in 2001–5. Tob Control. 2007; 16:202–6. [PubMed: 17565141]

6. Bobak M, Gilmore A, McKee M, et al. Changes in smoking prevalence in Russia, 1996–2004. Tob Control. 2006; 15:131–5. [PubMed: 16565462]

7. Andreev EM, Nolte E, Shkolnikov VM, et al. The evolving pattern of avoidable mortality in Russia. Int J Epidemiol. 2003; 32:437–46. [PubMed: 12777433]

8. Ezzati M, Lopez AD. Measuring the accumulated hazards of smoking: global and regional estimates for 2000. Tob Control. 2003; 12:79–85. [PubMed: 12612368]

9. World Health Organisation. WHO Framework Convention on Tobacco Control. Geneva: World Health Organisation; 2005.

10. Starks T. Red Star/Black Lungs: Anti-tobacco Campaigns in Twentieth-Century Russia. Social History of Alcohol and Drugs. 2006:21.

11. Gilmore AB, McKee M. Moving East: how the transnational tobacco industry gained entry to the emerging markets of the former Soviet Union-part II: an overview of priorities and tactics used to establish a manufacturing presence. Tob Control. 2004; 13:151–60. [PubMed: 15175532]

12. Danishevski K, McKee M. Campaigners fear that Russia's new tobacco law won't work. BMJ. 2002; 324:382. [PubMed: 11850361]

13. Ross, H.; Stoklosa, M.; Krasovsky, K. Tob Control. 2011. Economic and public health impact of 2007–2010 tobacco tax increases in Ukraine.

14. World Health Organisation. WHO FCTC Implementation Database. 2011.

15. World Health Organisation. Appendix IV: WHO report on the global tobacco epidemic, 2011: warning about the dangers of tobacco. Geneva: World Health Organisation; 2011.

16. Potvin L, Richard L, Edwards AC. Knowledge of cardiovascular disease risk factors among the Canadian population: relationships with indicators of socioeconomic status. Can Med Assoc J 2000. 2000; 162:S5–11.

17. Chapman S, Liberman J. Ensuring smokers are adequately informed: reflections on consumer rights, manufacturer responsibilities, and policy implications. Tob Control. 2005; 14(Suppl 2):ii8–13. [PubMed: 16046703]

18. World Health Organisation. WHO report on the global tobacco epidemic, 2008. Geneva: World Health Organisation; 2008.

19. Arnott D, Dockrell M, Sandford A, et al. Comprehensive smoke-free legislation in England: how advocacy won the day. Tob Control. 2007; 16:423–8. [PubMed: 18048621]

20. World Health Organisation. Global Adult Tobacco Survey (GATS): Russian Federation 2009. Moscow: 2010.

21. World Health Organisation. Global Adult Tobacco Survey (GATS) Ukraine 2010. Geneva: 2010.

22. Roberts B, Gilmore A, Stickley A, et al. Changes in smoking prevalence in eight countries of the former Soviet Union between 2001 and 2010. American Journal of Public Health. 2011 In press.

23. Danishevski K, Gilmore A, McKee M. Public attitudes towards smoking and tobacco control policy in Russia. Tob Control. 2008; 17:276–83. [PubMed: 18653793]

24. Movsisyan, N.; Sahakyan, K.; Mkrtchyan, Z., et al. Knowledge, attitudes and practices on tobacco control policies in adult population in Armenia. Yerevan: American University of Armenia Center for Health Services Research and Development; 2006.

25. Shkolnikov VM, Leon DA, Adamets S, et al. Educational level and adult mortality in Russia: an analysis of routine data 1979 to 1994. Soc Sci Med. 1998; 47:357–69. [PubMed: 9681906]

What this paper adds

Limited information exists on public knowledge in the countries of the former Soviet Union on the health effects of tobacco use and public attitudes towards tobacco control, despite the extremely high burden of tobacco-related disease in the region. This study shows a significant gap in the public's knowledge on tobacco's health effects, but also widespread support for tobacco control measures – particularly among those with greater knowledge on tobacco's health effects. The findings support increasing tobacco control measures in the region.

Table 1

Selected characteristics of the study sample, by country

	Armenia N (%)	Azerbaijan N (%)	Belarus N (%)	Georgia N (%)	Kazakhstan N (%)	Kyrgyzstan N (%)	Moldova N (%)	Russia N (%)	Ukraine N (%)
Gender									
Women	977 (54.3)	954 (53.0)	1015 (56.4)	1400 (63.6)	946 (52.6)	930 (51.7)	1003 (55.7)	1789 (59.6)	1157 (57.9)
Men	823 (45.7)	846 (47.0)	785 (43.6)	800 (36.4)	854 (47.4)	870 (48.3)	797 (44.3)	1211 (40.4)	843 (42.2)
Age group (years)									
18–29	551 (30.6)	625 (34.7)	508 (28.2)	434 (19.7)	549 (30.5)	618 (34.3)	508 (28.2)	732 (24.4)	518 (25.9)
30–39	368 (20.4)	336 (18.7)	342 (19.0)	422 (19.2)	414 (23.0)	415 (23.1)	286 (15.9)	519 (17.3)	310 (15.5)
40–49	398 (22.1)	411 (22.8)	317 (17.6)	433 (19.7)	319 (17.7)	334 (18.6)	315 (17.5)	527 (17.6)	326 (16.3)
50–59	227 (12.6)	252 (14.0)	257 (14.3)	384 (17.5)	252 (14.0)	234 (13.0)	336 (18.7)	520 (17.3)	293 (14.7)
60+	256 (14.2)	176 (9.8)	376 (20.9)	527 (24.0)	266 (14.8)	199 (11.1)	355 (19.7)	702 (23.4)	553 (27.7)
Living location									
Urban	1393 (77.4)	1016 (56.4)	1323 (73.5)	1051 (47.8)	1000 (55.6)	820 (45.6)	687 (38.2)	2179 (72.6)	1396 (69.8)
Rural	407 (22.6)	784 (43.6)	477 (26.5)	1149 (52.2)	800 (44.4)	980 (54.4)	1113 (61.8)	821 (27.4)	604 (30.2)
Educational level									
Completed higher education	325 (18.1)	323 (18.0)	396 (22.0)	796 (36.2)	428 (23.8)	320 (17.8)	332 (18.5)	662 (22.2)	484 (24.4)
Vocational/some higher education	395 (22.0)	339 (18.9)	621 (34.5)	555 (25.2)	630 (35.0)	376 (20.9)	557 (31.0)	1122 (37.6)	717 (36.1)
Secondary or less	1079 (60.0)	1129 (63.0)	783 (43.5)	848 (38.6)	742 (41.2)	1104 (61.3)	906 (50.5)	1204 (40.3)	783 (39.5)
Household economic situation									
Good/very good	499 (27.8)	458 (25.8)	409 (22.8)	117 (5.4)	572 (31.9)	622 (34.6)	461 (25.9)	519 (18.0)	328 (16.5)
Average	970 (54.0)	926 (52.2)	1158 (64.5)	1105 (50.6)	1097 (61.1)	994 (55.3)	873 (49.0)	1885 (65.3)	1188 (59.9)
Bad/very bad	328 (18.3)	391 (22.0)	228 (12.7)	964 (44.1)	126 (7.0)	181 (10.1)	447 (25.1)	484 (16.8)	467 (23.6)
Current smokers									
Women	19 (1.9)	6 (0.6)	134 (13.2)	85 (6.1)	88 (9.3)	55 (5.9)	45 (4.5)	288 (16.1)	141 (12.2)
Men	485 (58.9)	385 (45.5)	336 (42.8)	422 (52.8)	437 (51.2)	358 (41.2)	313 (39.3)	644 (53.3)	402 (47.9)
Response rates	(60.1)	(56.8)	(48.1)	(82.9)	(47.3)	(78.4)	(74.8)	(59.2)	(60.1)

Table 2

Health knowledge regarding tobacco, by country

	Armenia N (%) [95% CI]	Azerbaijan N (%) [95% CI]	Belarus N (%) [95% CI]	Georgia N (%) [95% CI]	Kazakhstan N (%) [95% CI]	Kyrgyzstan N (%) [95% CI]	Moldova N (%) [95% CI]	Russia N (%) [95% CI]	Ukraine N (%) [95% CI]
Health knowledge – agree smoking can cause:									
Lung cancer	1400 (77.8) [75.9; 79.7]	1437 (79.8) [78.0; 81.7]	1675 (93.1) [91.9; 94.2]	2043 (92.9) [91.8; 93.9]	1598 (88.8) [87.3; 90.2]	1665 (92.5) [91.3; 93.7]	1635 (90.8) [89.5; 92.2]	2708 (90.3) [89.2; 91.3]	1864 (93.2) [92.1; 94.3]
Heart disease	1423 (79.1) [77.2; 80.9]	926 (51.4) [49.1; 53.8]	1372 (76.2) [74.3; 78.2]	1613 (73.3) [71.5; 75.2]	1109 (61.6) [59.4; 63.9]	1061 (58.9) [56.7; 61.2]	1116 (62.0) [59.8; 64.2]	2278 (75.9) [74.4; 77.5]	1547 (77.4) [75.5; 79.2]
Bronchitis	916 (50.9) [48.6; 53.2]	773 (42.9) [40.7; 45.2]	1135 (63.1) [60.8; 65.3]	949 (43.1) [41.1; 45.2]	1047 (58.2) [55.9; 60.4]	1128 (62.7) [60.4; 64.9]	1198 (66.6) [64.4; 68.7]	2041 (68.0) [66.4; 69.7]	1251 (62.6) [60.4; 64.7]
Stroke	941 (52.3) [50.0; 54.6]	205 (11.4) [9.9; 12.9]	800 (44.4) [42.1; 46.7]	625 (28.4) [26.5; 30.3]	674 (37.4) [35.2; 39.7]	597 (33.2) [31.0; 35.3]	512 (28.4) [26.4; 30.5]	1554 (51.8) [50.0 53.6]	1049 (52.5) [50.3 54.6]
Caries	590 (32.8) [30.6; 34.9]	562 (31.2) [29.1; 33.4]	616 (34.2) [32.0; 36.4]	543 (24.7) [22.9; 26.5]	560 (31.1) [29.0; 33.3]	476 (26.4) [24.4; 28.5]	658 (36.6) [34.3; 38.8]	775 (25.8) [24.3; 27.4]	683 (34.2) [32.1; 36.2]
Impotence	246 (13.7) [12.1; 15.3]	117 (6.5) [5.4; 7.6]	475 (26.4) [24.4; 28.4]	234 (10.6) [9.3; 11.9]	224 (12.4) [10.9; 14.0]	215 (11.9) [10.4; 13.4]	597 (33.2) [31.0; 35.3]	596 (19.9) [18.4; 21.3]	718 (35.9) [33.8; 38.0]
Infertility	231 (12.8) [11.3; 14.4]	107 (5.9) [4.9; 7.0]	428 (23.8) [21.8; 25.7]	348 (15.8) [14.3; 17.3]	261 (14.5) [12.9; 16.1]	243 (13.5) [11.9; 15.1]	402 (22.3) [20.4; 24.3]	517 (17.2) [15.9; 18.6]	558 (27.9) [25.9; 29.9]
Influence of passive smoking on health:									
Yes negatively to children and adults	1032 (60.0) [57.7; 62.3]	1147 (76.3) [74.1; 78.4]	1468 (83.0) [81.2; 84.7]	1664 (79.2) [77.5; 80.9]	1357 (77.9) [76.0; 79.9]	1351 (79.8) [77.8; 81.7]	1511 (87.8) [86.2; 89.3]	2428 (85.1) [83.8; 86.4]	1622 (84.3) [82.7; 85.9]
Only influences some groups and when one inhales a lot	366 (21.3) [19.3; 23.2]	175 (11.6) [10.0; 13.3]	164 (9.3) [7.9; 10.6]	203 (9.7) [8.4; 10.9]	211 (12.1) [10.6; 13.7]	195 (11.5) [10.0; 13.0]	127 (7.4) [6.1; 8.6]	214 (7.5) [6.5; 8.5]	161 (8.4) [7.1; 9.6]
Only slightly influences	246 (14.3) [12.6; 16.0]	160 (10.6) [9.1; 12.2]	115 (6.5) [5.4; 7.7]	179 (8.5) [7.3; 9.7]	121 (7.0) [5.8; 8.1]	101 (6.0) [4.8; 7.1]	67 (3.9) [3.0; 4.8]	113 (4.0) [3.2; 4.7]	114 (5.9) [4.9; 7.0]
No influence	76 (4.4) [3.4; 5.4]	22 (1.5) [0.9; 2.1]	22 (1.2) [0.7; 1.8]	55 (2.6) [1.9; 3.3]	52 (3.0) [2.2; 3.8]	47 (2.8) [2.0; 3.6]	16 (0.9) [0.5; 1.4]	99 (3.5) [2.8; 4.1]	27 (1.4) [0.9; 1.9]
Light cigarettes:*									
Less harmful to health	264 (55.6) [51.1; 60.1]	169 (48.8) [43.6; 54.1]	192 (42.9) [38.3; 47.5]	195 (41.7) [37.2; 46.1]	236 (48.7) [44.2; 53.1]	164 (44.3) [39.2; 49.4]	130 (43.2) [37.6; 48.8]	291 (34.0) [30.8; 37.1]	214 (42.0) [37.7; 46.3]
Not less harmful to health	211 (44.4) [39.9; 48.9]	177 (51.2) [45.9; 56.4]	256 (57.1) [52.5; 61.7]	273 (58.3) [53.9; 62.8]	249 (51.3) [46.9; 55.8]	206 (55.7) [50.6; 60.8]	171 (56.8) [51.2; 62.4]	566 (66.0) [62.9; 69.2]	295 (58.0) [53.7; 62.3]
Mean summary knowledge score**	3.19 [3.12; 3.26]	2.29 [2.23; 2.35]	3.61 [3.53; 3.70]	2.89 [2.82; 2.96]	3.04 [2.96; 3.12]	2.99 [2.92; 3.06]	3.40 [3.31; 3.49]	3.49 [3.43; 3.55]	3.84 [3.75; 3.92]

*
Only results for current smokers included. Results exclude 'never heard of lights', don't knows and refusals.

**
Mean of aggregated scores for the 7 health questions on smoking as a cause of lung cancer, cardiovascular disease, stroke, bronchitis, caries, impotence, and infertility; producing aggregate score range of 0 (least knowledgeable) to 7 (most knowledgeable).

Table 3

Attitudes to different components of tobacco control, by country

	Armenia N (%) [95% CI]	Azerbaijan N (%) [95% CI]	Belarus N (%) [95% CI]	Georgia N (%) [95% CI]	Kazakhstan N (%) [95% CI]	Kyrgyzstan N (%) [95% CI]	Moldova N (%) [95% CI]	Russia N (%) [95% CI]	Ukraine N (%) [95% CI]
Effectiveness of authorities:									
Effective enough	377 (21.5) [19.5; 23.4]	235 (14.9) [13.1; 16.6]	426 (25.5) [23.4; 27.6]	445 (23.6) [21.7; 25.5]	407 (23.4) [21.4; 25.3]	140 (8.4) [7.1; 9.7]	146 (8.8) [7.4; 10.1]	251 (9.3) [8.2; 10.4]	225 (12.4) [10.9; 13.9]
Do something but could do more	804 (45.8) [43.5; 48.1]	475 (30.0) [27.8; 32.3]	615 (36.9) [34.6; 39.2]	590 (31.3) [29.2; 33.4]	660 (37.9) [35.6; 40.1]	392 (23.5) [21.5; 25.6]	552 (33.1) [30.9; 35.4]	877 (32.5) [30.7; 34.2]	617 (34.0) [31.8; 36.2]
Not effective	575 (32.7) [30.5; 34.9]	872 (55.1) [52.7; 57.6]	627 (37.6) [35.3; 39.9]	852 (45.2) [42.9; 47.4]	676 (38.8) [36.5; 41.1]	1133 (68.1) [65.8; 70.3]	968 (58.1) [55.7; 60.5]	1574 (58.3) [56.4; 60.1]	972 (53.6) [51.3; 55.9]
Views on tobacco prices:									
Should increase faster than prices of other goods	337 (19.3) [17.4; 21.1]	537 (37.3) [34.8; 39.8]	490 (30.3) [28.0; 32.5]	572 (29.4) [27.4; 31.4]	499 (29.1) [27.0; 31.3]	535 (33.5) [31.2; 35.8]	871 (55.2) [52.7; 57.7]	714 (28.3) [26.6; 30.1]	566 (32.2) [30.0; 34.4]
Should increase the same as prices of other goods	411 (23.5) [21.5; 25.5]	265 (18.4) [16.4; 20.4]	657 (40.6) [38.2; 42.9]	151 (7.8) [6.6; 9.0]	569 (33.2) [31.0; 35.4]	378 (23.7) [21.6; 25.8]	229 (14.5) [12.8; 16.3]	851 (33.8) [31.9; 35.6]	546 (31.0) [28.9; 33.2]
Should not increase	999 (57.2) [54.9; 59.5]	638 (44.3) [41.7; 46.9]	473 (29.2) [27.0; 31.4]	1222 (62.8) [60.7; 65.0]	645 (37.7) [35.4; 39.9]	684 (42.8) [40.4; 45.3]	478 (30.3) [28.0; 32.6]	954 (37.9) [36.0; 39.8]	647 (36.8) [34.5; 39.0]
Health warnings on cigarette packaging: *									
Should also have corresponding pictures	402 (22.3) [20.4; 24.3]	472 (26.2) [24.2; 28.3]	643 (35.7) [33.5; 37.9]	644 (29.3) [27.4; 31.2]	581 (32.3) [30.1; 34.4]	778 (43.2) [40.9; 45.5]	708 (39.3) [37.1; 41.6]	1021 (34.0) [32.3; 35.7]	605 (30.3) [28.2; 32.3]
Should have larger text warnings	563 (31.3) [29.1; 33.4]	680 (37.8) [35.5; 40.0]	546 (30.3) [28.2; 32.5]	425 (19.3) [17.7; 21.0]	563 (31.3) [29.1; 33.4]	656 (36.4) [34.2; 38.7]	599 (33.3) [31.1; 35.5]	1143 (38.1) [36.4; 39.8]	457 (22.9) [21.0; 24.7]
Should stay the same	863 (47.9) [45.6; 50.3]	216 (12.0) [10.5; 13.5]	647 (35.9) [33.7; 38.2]	953 (43.3) [41.3; 45.4]	722 (40.1) [37.8; 42.4]	531 (29.5) [27.4; 31.6]	511 (28.4) [26.30; 30.5]	876 (29.2) [27.6; 30.8]	800 (40.0) [37.9; 42.2]
Smoking ban in restaurants, bars, cafes:									
Should be a total ban	480 (27.6) [25.5; 29.7]	644 (41.3) [38.9; 43.8]	665 (39.3) [37.0; 41.7]	609 (29.7) [27.7; 31.7]	785 (45.2) [42.9; 47.5]	763 (44.6) [42.2; 46.9]	966 (55.8) [53.5; 58.2]	983 (36.8) [34.9; 38.6]	712 (38.2) [36.0; 40.4]
Should be equal smoking/non-smoking areas	340 (19.5) [17.7; 21.4]	125 (8.0) [6.7; 9.4]	611 (36.1) [33.8; 38.4]	568 (27.7) [25.8; 29.6]	483 (27.8) [25.7; 29.9]	478 (27.9) [25.8; 30.0]	488 (28.2) [26.1; 30.3]	974 (36.4) [34.6; 38.3]	658 (35.3) [33.1; 37.5]
Should be small non-smoking areas	235 (13.5) [11.9; 15.1]	204 (13.1) [11.4; 14.8]	40 (2.4) [1.6; 3.1]	162 (7.9) [6.7; 9.1]	70 (4.0) [3.1; 5.0]	50 (2.9) [2.1; 3.7]	45 (2.6) [1.9; 3.4]	135 (5.1) [4.2; 5.9]	72 (3.9) [3.0; 4.7]

	Armenia N (%) [95% CI]	Azerbaijan N (%) [95% CI]	Belarus N (%) [95% CI]	Georgia N (%) [95% CI]	Kazakhstan N (%) [95% CI]	Kyrgyzstan N (%) [95% CI]	Moldova N (%) [95% CI]	Russia N (%) [95% CI]	Ukraine N (%) [95% CI]
Should be small areas for smoking	568 (32.6) [30.4; 34.8]	461 (29.6) [27.3; 31.8]	309 (18.3) [16.4; 20.1]	507 (24.7) [22.9; 26.6]	289 (16.6) [14.9; 18.4]	342 (20.0) [18.1; 21.9]	195 (11.3) [9.8; 12.8]	468 (17.5) [16.1; 19.0]	373 (20.0) [18.2; 21.8]
Should be no smoking ban in restaurants, bars, cafes	119 (6.8) [5.6; 8.0]	125 (8.0) [6.7; 9.4]	66 (3.9) [3.0; 4.8]	204 (10.0) [8.7; 11.2]	110 (6.3) [5.2; 7.5]	79 (4.6) [3.6; 5.6]	36 (2.1) [1.4; 2.8]	113 (4.2) [3.5; 5.0]	50 (2.7) [1.9; 3.4]
Mean summary support score [**]									
	1.01 [0.96; 1.06]	1.51 [1.45; 1.56]	1.38 [1.32; 1.44]	1.08 [1.04; 1.12]	1.39 [1.34; 1.44]	1.59 [1.54; 1.65]	1.87 [1.81; 1.93]	1.41 [1.37; 1.46]	1.25 [1.19; 1.30]

* Only data for respondents agreeing with statement are presented

**
Mean of aggregated scores for questions on supporting tobacco control measures of price increases, pictorial warnings, larger text warnings, smoking bans; producing aggregate scores ranging from 0 (least supportive) to 4 (most supportive).

Table 4

Characteristics associated with high knowledge of the harmful effects of tobacco, all countries combined

Variable/category	Frequency [a] N (%)	Bivariate OR [95% CI]	Multivariate OR [95% CI]
Country:			
Kyrgyzstan	246 (13.7)	Ref	Ref
Armenia	365 (20.3)	1.61 [1.20; 2.16] **	1.58 [1.17; 2.12] **
Azerbaijan	79 (4.4)	0.29 [0.17; 0.50] **	0.29 [0.17; 0.50] **
Belarus	531 (29.5)	2.64 [1.98; 3.53] **	2.35 [1.75; 3.17] **
Georgia	333 (15.1)	1.13 [0.83; 1.53]	1.03 [0.76; 1.42]
Kazakhstan	350 (19.4)	1.52 [1.13; 2.06]	1.33 [0.95; 1.85]
Moldova	477 (26.5)	2.28 [1.65; 3.14] **	2.22 [1.59; 3.10] **
Russia	724 (24.1)	2.01 [1.56; 2.59] **	1.91 [1.48; 2.46] **
Ukraine	685 (34.3)	3.29 [2.56; 4.24] **	3.08 [2.38; 3.98] **
Gender:			
Men	1514 (19.3)	Ref	Ref
Women	2276 (22.4)	1.20 [1.10; 1.30] **	1.16 [1.05; 1.29] **
Age group:			
18–29	1072 (21.3)	Ref	Ref
30–39	692 (20.3)	0.89 [0.79; 1.01]	0.88 [0.77; 1.00]
40–49	713 (21.1)	1.02 [0.91; 1.15]	1.02 [0.90; 1.16]
50–59	600 (21.8)	1.00 [0.88; 1.13]	0.97 [0.85; 1.10]
60+	713 (20.9)	0.91 [0.80; 1.03]	0.82 [0.72; 0.94] **
Education:			
Secondary or less	1480 (17.3)	Ref	Ref
Vocational/some higher education	1265 (23.8)	1.44 [1.30; 1.59] **	1.25 [1.13; 1.39] **
Completed higher education	1035 (25.5)	1.57 [1.40; 1.76] **	1.42 [1.26; 1.61] **
Living location:			
Urban	2507 (23.1)	Ref	Ref
Rural	1283 (18.0)	0.75 [0.65; 0.87] **	0.88 [0.75; 1.02]
Household economic status:			
Bad/very bad	716 (19.8)	Ref	Ref
Average	2193 (21.5)	1.06 [0.94; 1.20]	0.97 [0.85; 1.10]
Good/very good	850 (21.3)	1.08 [0.92; 1.26]	1.00 [0.85; 1.17]
Member of an organisation:			
Not a member	2707 (20.0)	Ref	Ref
Member	738 (23.0)	1.03 [0.89; 1.18]	1.12 [0.95; 1.31]
Active member	325 (28.3)	1.46 [1.24; 1.72] **	1.28 [1.08; 1.52] *
Smoking status:			
Current smoker	860 (18.5)	Ref	Ref

Variable/category	Frequency [a] N (%)	Bivariate OR [95% CI]	Multivariate OR [95% CI]
Former smoker	481 (26.9)	1.55 [1.34; 1.80] **	1.44 [1.23; 1.67] **
Never smoked	2440 (21.2)	1.21 [1.09; 1.33] **	1.20 [1.07; 1.36] **

*
P<0.05.

**
P<0.01

[a]Frequency of respondents in each variable category with a high knowledge score (score of 5–7). The tobacco knowledge outcome was the tobacco knowledge score dichotomised into having a high knowledge (scores of 5–7) or low knowledge (scores of 0–4) of tobacco's health effects.

Table 5

Characteristics associated with high support for tobacco control, all countries combined

Variable/category	Frequency [a] N (%)	Bivariate OR [95% CI]	Multivariate OR [95% CI]
Country:			
Kyrgyzstan	350 (22.4)	Ref	Ref
Armenia	155 (9.1)	**0.35 [0.25; 0.47]** **	**0.33 [0.23; 0.46]** **
Azerbaijan	246 (18.1)	0.76 [0.56; 1.04]	0.84 [0.60; 1.17]
Belarus	305 (19.6)	0.84 [0.64; 1.11]	**0.71 [0.53; 0.95]** *
Georgia	158 (8.5)	**0.32 [0.24; 0.43]** **	**0.29 [0.21; 0.40]** **
Kazakhstan	296 (17.6)	**0.74 [0.57; 0.97]** *	**0.55 [0.40; 0.75]** **
Moldova	501 (32.5)	**1.66 [1.29; 2.16]** **	**1.49 [1.13; 1.95]** **
Russia	427 (18.1)	**0.76 [0.61; 0.96]** *	**0.74 [0.58; 0.95]** *
Ukraine	269 (15.9)	**0.65 [0.51; 0.84]** **	**0.58 [0.44; 0.76]** **
Gender:			
Men	903 (13.0)	Ref	Ref
Women	1804 (21.6)	**1.79 [1.63; 1.97]** **	**1.13 [1.01; 1.26]** *
Age group:			
18–29	767 (17.3)	Ref	Ref
30–39	477 (15.9)	0.92 [0.80; 1.06]	0.98 [0.85; 1.13]
40–49	491 (16.6)	0.98 [0.85; 1.13]	1.01 [0.87; 1.17]
50–59	450 (19.1)	1.10 [0.96; 1.27]	1.07 [0.92; 1.25]
60+	522 (20.4)	1.27 **[1.10; 1.47]** **	**1.19 [1.01; 1.39]** *
Education:			
Secondary or less	1232 (17.0)	Ref	Ref
Vocational/some higher education	813 (18.0)	1.02 [0.91; 1.14]	1.03 [0.91; 1.17]
Completed higher education	660 (18.7)	1.10 [0.96; 1.25]	1.11 [0.97; 1.26]
Living location:			
Urban	1532 (16.6)	Ref	Ref
Rural	1175 (19.2)	1.19 **[1.02; 1.39]** *	1.04 [0.90; 1.19]
Household economic status:			
Bad/very bad	497 (16.9)	Ref	Ref
Average	1466 (16.8)	0.97 [0.83; 1.12]	0.86 [0.75; 1.00]
Good/very good	720 (20.4)	1.31 **[1.11; 1.55]** **	1.08 [0.90; 1.29]
Member of an organisation:			
Not a member	1908 (16.9)	Ref	Ref
Member	543 (18.5)	1.08 [0.93; 1.25]	**1.44 [1.20; 1.72]** **
Active member	237 (23.7)	1.60 **[1.33; 1.93]** **	**1.49 [1.23; 1.81]** **
Tobacco health effects knowledge: [b]			
Score 0–2	778 (13.9)	Ref	Ref

Variable/category	Frequency [a] N (%)	Bivariate OR [95% CI]	Multivariate OR [95% CI]
Score 3	607 (16.8)	1.34 [1.17; 1.53] **	1.31 [1.13; 1.51] **
Score 4	518 (18.8)	1.56 [1.33; 1.84] **	1.53 [1.29; 1.80] **
Score 5–7	804 (23.9)	2.10 [1.79; 2.45] **	2.01 [1.72; 2.35] **
Smoking status:			
Current smoker	248 (5.8)	Ref	Ref
Former smoker	263 (17.1)	3.46 [2.80; 4.28] **	3.12 [2.51; 3.86] **
Never smoked	2188 (23.2)	5.22 [4.43; 6.15] **	4.51 [3.78; 5.39] **

*
P<0.05.

**
P<0.01

[a] Frequency of respondents in each variable category with a high support score for tobacco control (score of 3–4). The tobacco control support outcome was the tobacco control support score dichotomised into being supportive (scores of 3–4) or not being supportive (scores of 0–2) of tobacco control.

[b] Knowledge score on the health effects of tobacco categorised into 4 groups based upon an even distribution of responses producing score ranges of 0 to 2; 3; 4; and 5 to 7.