

Andreeva, T. I. (2012). Differences by gender and education in responding to tobacco control measures implemented in Ukraine since 2005. *Tobacco Control and Public Health in Eastern Europe*, 2(2), 111-121. doi:10.6084/m9.figshare.105433

## Differences by gender and education in responding to tobacco control measures implemented in Ukraine since 2005

Tatiana I. Andreeva

**BACKGROUND:** Socially disadvantaged population groups are known to be less responsive to tobacco control policies. The objective of the study was to consider changes in smoking prevalence, exposure to secondhand smoke and tobacco advertising, as well as tobacco-related knowledge by gender and education groups in Ukraine after the implementation of tobacco control policies since 2006.

**METHODS:** Prevalence of daily smoking was compared in 2000, 2005, and 2010. Data on tobacco awareness, exposure to SHS and tobacco advertising were available from the surveys conducted in 2005 and 2010.

**RESULTS:** The decline in smoking prevalence in 2005-2010 was similar for men and women with different levels of education. Men with university education have lower smoking rates than other men. Women with less than secondary education had the lowest smoking rates which keep consistently low over time. Secondhand smoke and to-

bacco advertising exposure declined similarly across gender and education. Knowledge about tobacco-related health hazards increased more substantially in lower educated groups.

**CONCLUSIONS:** All demographic groups in Ukraine revealed decline in smoking prevalence, exposure to SHS and the tobacco advertising as well as increase of tobacco-related health knowledge in response to tobacco control policies. Lower educated groups were more responsive to tobacco control policies than it was expected based on findings from high-income countries. In such countries as Ukraine comprehensive tobacco control measures are beneficial for all social groups and could lead to quick decline in prevalence of active and passive smoking.

**KEYWORDS:** smoking; smoking prevalence; exposure to secondhand smoke; tobacco advertising; tobacco-related knowledge; education gradient; Ukraine.

## Различия по полу и образованию в реагировании на меры контроля над табаком, осуществляемые в Украине после 2005 года

Татьяна Андреева

**АКТУАЛЬНОСТЬ:** Известно, что социально неблагоприятные группы населения отличаются меньшей готовностью реагировать на меры контроля над табаком. Целью данной работы было рассмотрение изменений распространенности курения, подверженности воздействию вторичного дыма и табачной рекламы, а также знаний о влиянии табака на здоровье в зависимости от пола и образования в Украине после осуществления политики контроля над табаком начиная с 2006 года.

**МЕТОДЫ:** Распространенность курения сравнивалась по данным опросов 2000, 2005 и 2010 годов. Данные об информированности, о подверженности воздействию вторичного дыма и табачной рекламе были собраны в опросах 2005 и 2010 годов.

**РЕЗУЛЬТАТЫ:** Снижение распространенности курения в 2005-2010 годах было подобным среди мужчин и женщин разных образовательных групп. Мужчины с высшим образованием характеризуются меньшей распространенностью курения, чем все другие группы мужчин. Среди женщин с образованием ниже среднего наблю-

дается самая низкая распространенность курения, которая остается таковой во всех проведенных опросах. Подверженность воздействию вторичного дыма и табачной рекламы снижалась одинаково в группах, различающихся по полу и образованию. Рост информированности о воздействии табака на здоровье оказался более значительным среди менее образованных групп населения.

**ЗАКЛЮЧЕНИЕ:** В ответ на внедрение мер контроля над табаком все демографические группы в Украине обнаружили снижение распространенности курения, а также подверженности воздействию вторичного табачного дыма и табачной рекламы, как и рост осведомленности об опасности курения для здоровья. Реакция менее образованных групп населения на меры контроля над табаком оказалась более выраженной, чем можно было ожидать, исходя из результатов исследований, проведенных в странах с высоким уровнем доходов. В таких странах, как Украина, разносторонние меры контроля над табаком оказываются полезными для всех социальных групп и могут привести к быстрому сни-

жению распространности активного и пассивного курения.

КЛЮЧЕВЫЕ СЛОВА: курение; распространен-

ность курения; подверженность воздействию вторичного табачного дыма; табачная реклама; знания о влиянии табака на здоровье; образовательный градиент; Украина.

## Відмінності за статтю та освітою у реагуванні на заходи контролю над тютюном, застосовані в Україні після 2005 року

Тетяна Андрєєва

**АКТУАЛЬНІСТЬ:** Відомо, що соціально вразливі групи населення відрізняються меншою готовністю реагувати на політику контролю над тютюном. Ця робота мала на меті розглянути зміни, які відбулися у поширеності куріння, перебуванні під впливом вторинного тютюнового диму та тютюнової реклами, а також у поінформованості щодо впливу тютюну на здоров'я залежно від статі та освіти в Україні після впровадження заходів контролю над тютюном починаючи з 2006 року.

**МЕТОДИ:** Поширеність куріння порівнювали за даними опитувань 2000, 2005 та 2010 років. Дані щодо поінформованості, а також перебування під впливом вторинного диму та тютюнової реклами зібрані в опитуваннях 2005 та 2010 років.

**РЕЗУЛЬТАТИ:** Зниження поширеності куріння у 2005-2010 роках відбувалося подібним чином серед чоловіків та жінок у різних освітніх групах. Чоловіки з вищою освітою мають нижчі показники поширеності куріння, ніж всі інші чоловіки. Для жінок з освітою нижче, ніж середня, характерна найнижча поширеність куріння, яка залишається такою весь час. Перебування під

впливом вторинного диму та тютюнової реклами зменшилося однаково у групах, що відрізняються за статтю та освітою. Збільшення поінформованості про вплив тютюну на здоров'я було більш відчутним серед менш освічених груп населення.

**ВИСНОВКИ:** Після введення політики контролю над тютюном в Україні в усіх демографічних групах відбулося зниження поширеності куріння, а також перебування під впливом навколишнього тютюнового диму та тютюнової реклами, підвищилася поінформованість населення щодо впливу тютюну на здоров'я. Менш освічені групи населення відреагували на заходи контролю над тютюном суттєвіше, ніж можна було очікувати з огляду на результати досліджень, проведених в багатих країнах. У таких країнах, як Україна, заходи контролю над тютюном є корисними для всіх груп населення і можуть призвести до швидкого скорочення активного та пасивного куріння.

**КЛЮЧОВІ СЛОВА:** куріння; поширеність куріння; перебування під впливом вторинного диму; тютюнова реклама; знання про вплив тютюну на здоров'я; освітній градиент; Україна.

## INTRODUCTION

It is widely observed that in those countries where comprehensive tobacco control measures are implemented, socially disadvantaged population groups are more likely to have higher smoking prevalence (Katainen, 2010), more likely to condone passive smoking (Lund & Lund, 2005), and less likely to stop smoking (Harman, Graham, Francis, & Inskip, 2006; Hu, Sekine, Gaina, Nasermoaddeli, & Kagami-mori, 2007), creating a continuum of tobacco-related health disparities (Fagan et al., 2004; Fagan, Moolchan, Lawrence, Fernander, & Ponder, 2007). However, these findings are from high-income countries, while not much is pub-

lished regarding this phenomenon in low- and middle-income countries. Ukraine, which recently has implemented a wide range of successful tobacco control measures in line with the Framework Convention on Tobacco Control and witnessed the decrease in the prevalence of smoking, is an interesting example to consider. Between 2005 and 2010, daily smoking prevalence for Ukrainian population 15 years old and over decreased from 37.4% to 25.5% (Ministry of Health of Ukraine, 2010).

First to be implemented was smoking ban in public places since the middle of 2006. This measure was not strictly enforced but was widely covered by the media. An

omnibus survey conducted in late 2006 revealed first ever decline in smoking prevalence among women (Andreeva, Krasovsky, & Kharchenko, 2009). Smoke-free legislation was further strengthened in the middle of 2009.

At the end of 2006, new more prominent (30% of front and back sides) textual health warnings on cigarette packs were introduced. An omnibus survey conducted in 2007 showed a slight decrease in smoking prevalence among men and a further decrease among women (Andreeva, et al., 2009). Based on the data collected in 2009, we concluded that remembering more particular health warnings was associated with percep-

tion of serious health hazard caused by tobacco use in male smokers, which could be translated in subsequent quitting. That analysis also helped to reveal that there was no education gradient in male smokers with regard to remembering tobacco pack health warnings which is present in non-smokers and former smokers (Andreeva & Krasovsky, 2011).

Since 2009, outdoor tobacco advertising was banned. In 2008-2010, several increases of tobacco excise tax were introduced (H. Ross, Stoklosa, & Krasovsky, 2012) resulting in further decline in smoking prevalence, which was documented in the Global Adult Tobacco Survey (GATS) report in 2010 (Ministry of Health of Ukraine, 2010).

Earlier, we have analyzed how population of Ukraine reacted with knowledge increase to the information provided on tobacco packs (Andreeva & Krasovsky, 2010); however, most of the analysis which was already conducted did not consider in detail tobacco control outcomes by socio-demographic groups.

Measurements of social class traditional in such studies are not easily

applicable to the data collected from the Ukrainian population. Measures of income collected in population surveys are hardly ever associated with any health behaviors to the contrary of education which is usually better associated with the health-related indicators (Andreeva, 2008). Gender is another consistent effect measure modifier with most health behavior studies (Andreeva & Krasovsky, 2007, 2011; Andreeva, Krasovsky, & Semenova, 2007). So, the goal of this study was to consider changes in smoking prevalence as well as in indicators of exposure to secondhand smoke (SHS) and tobacco advertising along with the tobacco-health knowledge by gender and education groups.

## MATERIALS AND METHODS

Prevalence of daily smoking over time was estimated with the data from three different nationally representative surveys conducted in 2000, 2005, and 2010. Data on the exposure to secondhand smoke, tobacco advertising, and tobacco-related health knowledge was available from the surveys conducted in 2005 and 2010. Details of data collection are described in the corre-

sponding reports (Krasovsky, Andreeva, Krisanov, Mashliakivsky, & Rud, 2002; Ministry of Health of Ukraine, 2010; The International Centre for Policy Studies, 2005). All three surveys were conducted in nationally representative samples of Ukrainian population. The sampled population represented Ukrainian citizens aged 15 and older who permanently reside on Ukrainian territory, were not engaged in military service, and were not imprisoned or residing in medical facilities. All interviews were conducted face-to-face anonymously.

In 2000, the sampling differed from later surveys in a way that at first stage provinces (oblasts) were randomly selected to represent each of the macro-regions of Ukraine, the survey was conducted in November 2000 with 1797 respondents aged 15-82.

The 2005 survey, the survey design consisted of the selection of 100 settlements (Primary Sampling Units - PSU) across all Ukrainian oblasts. A four-stage selection process was used that included random selection of post offices, postal areas, and addresses within each settlement. One individual

**Table 1. Number and percentage of participants of three surveys by gender and education**

Gender	Education	Survey year		
		2000	2005	2010
		Number or respondents and percentage		
Men		837 (100.0%)	967 (100.0%)	4072 (100.0%)
	less than secondary	188 (22.5%)	123 (12.7%)	800 (19.6%)
	secondary	548 (65.5%)	429 (44.4%)	1004 (24.7%)
	high school	16 (1.9%)	228 (23.6%)	1516 (37.2%)
	college or university	85 (10.2%)	187 (19.3%)	752 (18.5%)
Women		958 (100.0%)	1268 (100.0%)	4085 (100.0%)
	less than secondary	217 (22.7%)	246 (19.4%)	1028 (25.2%)
	secondary	637 (66.5%)	440 (34.7%)	870 (21.3%)
	high school	24 (2.5%)	330 (26.0%)	1386 (33.9%)
	college or university	80 (8.4%)	252 (19.9%)	801 (19.6%)

was randomly selected within each selected address. Data were adjusted to national population estimates based on sex, age and region of residence. A total of 2,239 surveys were completed (The International Centre for Policy Studies, 2005).

The 2010 survey, the Ukraine Global Adult Tobacco Survey, was a nationally representative household survey of all non-institutionalized men and women aged 15 years and older with two-stage sample design. At the first stage, 600 PSUs were selected randomly by probability proportional to the size. Voter precincts were used as PSUs in the urban areas, and villages (or groups of small villages) were used as PSUs in the rural areas. At the second stage, an average of 26 housing units in each urban PSU and 22 housing units in each rural PSU were randomly selected. In total, 13,833 households were selected throughout the country, from which 8,173 individual interviews were completed – 4,076 urban and 4,097 rural. The data were weighted to adjust for the probability of selection of the household and individ-

ual, non-response at the household and individual levels, and post-strata calibration for residence, gender, and tobacco use.

Daily smoking prevalence was estimated according to the WHO recommendations (WHO, 1998) in 2000 and 2005, and in 2010 according to Global Adult Tobacco Survey guideline (Global Tobacco Surveillance System Collaborative Group, 2011). Both approaches allow measurement of both daily and current smoking. However, as different questionnaires provide less consistent measurements for occasional smoking, daily smoking, which is a more reliable measure, was used in this analysis.

In both the 2005 and 2010 surveys, respondents were asked the same question regarding secondhand smoke exposure: "How often do you happen to inhale other people's smoke? Would you say it happens almost never or rarely (1), several times a week (2), almost daily (3), or regularly - several hours a day (4)?" For simplicity sake answer options 3 and 4 were collapsed into

one considering it 'exposed daily or almost daily' vs. options 1 and 2 combined.

To collect data on tobacco-related health knowledge, respondents were asked whether particular diseases and health problems are caused by smoking or secondhand smoke exposure. Questions were related to addictiveness of cigarettes, whether smoking causes heart disease, impotence, whether SHS is hazardous to those surrounding smokers.

In both the 2005 and 2010 surveys, respondents were asked whether they noticed tobacco advertising on TV, radio, billboards/outdoors, newspapers or magazines, stores/point of sale, and promotional items (i.e., brand logos on clothing or other promotion items) within the month preceding the survey.

Analysis considered the survey year as the potential determinant and all the variables described above as dependent variables. As three study groups were sampled in different ways, the bivariate analysis considered each categorical

**Table 2. Percentage of adults 15 years and older who were daily smokers in 2000, 2005 and 2010 surveys, by gender and education**

Gender	Education	Survey year			Sig for 2005-2010**
		2000	2005	2010	
Percentage of daily smokers (95% CI)					
Men	less than secondary	53.2 (46.1 - 60.3)	57.3 (49.2 - 65.4)	40.3 (35.8 - 44.8)	*
	secondary	62.6 (58.5 - 66.6)	67.0 (62.7 - 71.4)	47.9 (43.9 - 51.8)	*
	high school	43.8 (19.4 - 68.1)	67.6 (61.7 - 73.5)	51.4 (48.3 - 54.4)	*
	college or university	40.0 (29.6 - 50.4)	48.1 (40.8 - 55.3)	35.8 (31.5 - 40.2)	*
Women	less than secondary	6.5 (3.2 - 9.7)	3.8 (1.4 - 6.3)	4.4 (1.8 - 7.0)	NS
	secondary	14.8 (12.0 - 17.5)	18.6 (14.9 - 22.2)	10.1 (7.3 - 12.8)	*
	high school	20.8 (4.6 - 37.1)	18.4 (14.2 - 22.7)	10.4 (8.1 - 12.7)	*
	college or university	21.3 (12.3 - 30.2)	24.0 (18.5 - 29.6)	9.5 (7.0 - 12.1)	*

NS – non-significant difference

\* - difference is significant

\*\* Significance of change between 2005 and 2010 measurements is based on the confidence intervals comparison. With overlapping confidence intervals inference of non-significant difference was made and vice-versa.



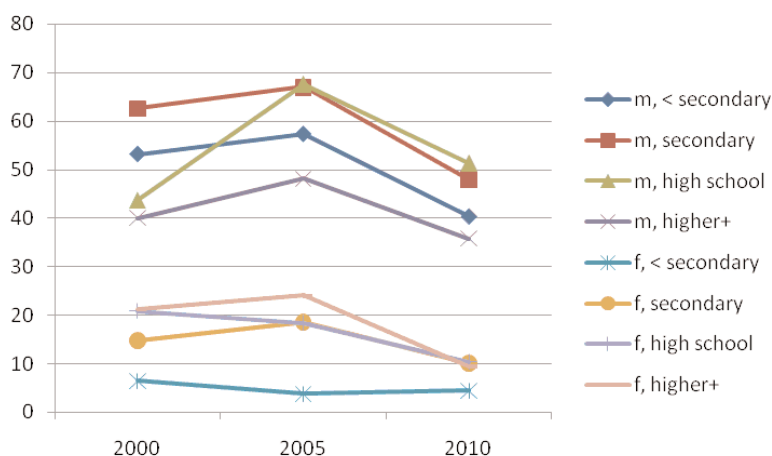
measure with its percentage and 95% confidence interval by gender and education groups as well as by year. Comparison of 95% confidence intervals was used to reject null-hypothesis of equal percentages in case confidence intervals did not overlap.

To control for potential confounders, the datasets were pooled together and for each outcome measure binary logistic regression analysis was conducted controlled for age, place of residence and marital status, and stratified by gender and education. However, as controlling for age, residence and marital status did not show any substantial attenuation, results are shown in the tables in their original bivariate form. Prevalence ratios are shown to illustrate the change between 2005 and 2010.

## RESULTS

### Study groups characteristics

Percentage distribution of the surveyed groups by gender and level of education is shown in Table 1. In 2000, 837 men and 958 women were surveyed. In 2005, 967 men and 1268 women participated.



**Figure 1. The changes of daily smoking prevalence in the Ukrainian population in 2000-2010 by gender and education groups.**

In 2010, 4072 men and 4085 women responded to the survey questionnaires. Changes in distribution by education could be partly caused by real changes of Ukrainian population' education structure, namely decline of percentage of those with secondary education and increase in those with higher education. However, most of the discrepancies are due to different questionnaires used in the three surveys.

### Changes in the prevalence of daily smoking

Percentages of those who were daily smokers in 2000, 2005, and 2010 are shown in Table 2 and Figure 1. By 2005, prevalence of daily smoking increased in most gender-education groups. People with university education had the lowest prevalence of daily smoking in men and the highest in women.

The decline in smoking in 2005-2010 was similar for men with different levels of education. For women the largest decrease in smoking was seen for those with college or higher education – from 24% to 10%. In 2010, the smoking prevalence was significantly lower

than in 2005 in every group except for women with less than secondary education.

For all survey years, the following group-specific trends were observed:

- 1) Men with college or higher education had lower smoking prevalence than other men;
- 2) Men with college or higher education had higher smoking prevalence than every women's group (only in 2000 confidence intervals of men and women with university education overlapped due to small sample size).
- 3) Women with less than secondary education had lower smoking prevalence than other women. It is as low as 3.8-6.5% but keeps stable.

### Changes in second-hand smoke exposure

Percentages of those exposed to second-hand smoke daily or almost daily in shown in Table 3. The exposure decreased in 2005-2010 from 58% to 40% in men and from 50% to 26% in women. The exposure remained the highest among those who have secondary or high school education, and the decrease was most prominent among both men and women with university education. Only for men with less than secondary education the decrease was not significant.

### Changes in the knowledge of tobacco-related health hazard

Results are shown in Table 4. Knowledge of all hazards which were described on tobacco packs as health warnings increased greatly. Though knowledge remained the highest among those with university education, it increased more significantly in lower educated

groups, in both men and women. For instance, percentage of men who knew that smoking causes impotence increased from 7.7% in 2005 to 46.0% in 2010 or by 6.0 in lowest education group and from 13.1% to 63.4% (by 4.8) in the group with college or university education.

**Changes in tobacco advertising exposure**

Results are shown in Table 5. After the ban of outdoor tobacco advertising in 2009, percentage of people who saw advertising on billboards decreased by three times compared to 2005 survey in both men and women. Similar, though smaller, was the decrease in the exposure to advertising on TV. With both types of advertising, there was no consistent pattern of exposure by education group.

To the contrary, tobacco advertising seen in newspapers/magazines and at the points of sales increased.

The change in exposure to newspaper/magazine ads was more prominent in men and especially those with lower education. Exposure to ads at the points of sales, though seen to similar extent by men and women, increased from lower level in women, and the increase was the largest in more educated women.

Both in 2005 and 2010 men were significantly more exposed to tobacco advertising in stores and on billboards than women; however, higher smoking prevalence among men could account for that.

**DISCUSSION**

Analysis of smoking-related data in Ukraine in 2000-2010 shows that while rather limited tobacco control measures were in place before 2005, prevalence of daily smoking slightly increased in all gender-education groups. Those with university education had the lowest prevalence of daily smoking in men while in women the lowest

prevalence was observed among those with less than secondary education. The dynamic of the smoking prevalence before 2005 was described earlier (Andreeva & Krasovsky, 2007). However, after implementation of some tobacco control measures, women with higher education were the group which reacted most obviously. The observed patterns of more educated men smoking at lower rates than less educated (Jitnarin et al., 2010; Martinez et al., 2006) and the reverse pattern among women (Curtin, Morabia, & Bernstein, 1997) with subsequent flattening of those differences is found in many countries and characterizes certain stages of the tobacco epidemic.

Analysis of Ukrainian data also showed absence of much disparity in how people are protected against SHS, the tobacco advertising, and their awareness of tobacco health hazards.

It has been stated long ago that those poorer and less educated are

**Table 3. Changes of SHS exposure in 2005 2010 by gender and education: percentages of those exposed to second-hand smoke daily or almost daily**

Gender	Education groups	2005				2010				PR (2005/ 2010)	PD (2005- 2010)
		N	%	95%CI lower	95%CI upper	N	%	95%CI lower	95%CI upper		
Men all		949	57.9	54.7	61.0	4034	41.3	39.8	42.8	1.4	16.6
	less than secondary	117	39.7	30.8	48.6	786	34.5	31.2	37.9	1.1	5.2
	secondary	423	62.3	57.7	66.9	993	40.5	37.4	43.5	1.5	21.8
	high school	224	59.9	53.5	66.3	1499	46.8	44.3	49.3	1.3	13.1
	college or university	185	58.8	51.7	65.9	746	38.2	34.7	41.7	1.5	20.6
	p		<0.001			<0.001					
Women all		1251	49.5	46.7	52.2	4045	25.8	24.4	27.1	1.9	23.7
	less than secondary	239	35.2	29.2	41.3	1010	16.0	13.7	18.2	2.2	19.3
	secondary	435	53.9	49.3	58.6	862	31.2	28.2	34.3	1.7	22.7
	high school	323	51.1	45.7	56.6	1372	28.3	25.9	30.7	1.8	22.8
	college or university	250	52.6	46.4	58.8	795	25.2	22.2	28.2	2.1	27.5
	p		<0.001			<0.001					

p – Chi-square p-value for difference between groups

PR – prevalence ratio

PD – prevalence difference

more likely to have unhealthy behaviors (Fong et al., 2007; C. E. Ross & Wu, 1995). The dominant trend in smoking prevalence in most Western countries is its increasing association with lower socioeconomic positions, making it a major factor behind the inequalities in health (Katainen, 2010).

Extensive literature is devoted to understanding the mechanism how social shaping of health disparities occurs through policies, knowledge and behaviors (Link, 2008; Link & Phelan, 2009; Pampel, Krueger, & Denney, 2010). This assumes that socioeconomic status (SES) embodies an array of resources, such as money, knowledge, prestige, power, and beneficial social connections that protect health no matter what mechanisms are relevant at any given time and no matter what the risk and protective factors are in a given place or time (Link, Phelan, Miech, & Westin, 2008; Phelan, Link, & Tehranifar, 2010).

Besides that, it was found in several developed countries that the health behaviors gap between the social classes widens with time (Alvarez-Dardet, Montahud, & Ruiz, 2001). While the overall smoking prevalence decreases, it stays stable among those with a

low socio-economic status (Verburg, Toet, & van Ameijden, 2005). Eventually smoking became more prevalent in the low social classes. For instance, comprehensive tobacco control policies implemented in the UK caused more affluent groups to increasingly respond by quitting smoking while quit rates remained lower in less affluent groups (Great Britain: Department of Health, 2010). In 2010 in England, 29% of men and 28% of women in routine and manual occupations were smokers compared to 14% of men and 12% of women in managerial and professional occupations.

However, in Ukraine in 2005-2010 smoking prevalence decreased among all groups, except women with less than secondary education whose prevalence of smoking remains the lowest. Absence in Ukraine of the disparities seen in the West may have different explanations.

#### Hypotheses regarding the deviating tobacco disparities trends in Ukraine

First could be that our measurement of SES was not sensitive enough to measure differences in income which can be translated

into better health behavior. Socio-economic position is typically measured as education level with age left full-time education being a standard indicator of SEP (Harman, et al., 2006). Still better education in countries in transition is not always translated in higher income and access to better health determinants.

Second explanation could be that consistent implementation of multiple tobacco control measures in Ukraine could enable equal or similar impact on different socioeconomic groups. Obviously, different measures are more or less likely to reach various SES groups. Tobacco taxation and change in tobacco pack health warnings could reach those groups which could not be influenced by health education campaigns.

Third possible explanation may be that the theory works another way in low- and middle-income countries. In particular, there may be an overlap between all or some mechanisms (Phelan, et al., 2010) which are accountable for disadvantages of lower socio-economic status groups revealed in high income countries, on the one hand, and higher use of alcohol and tobacco by more affluent groups in some

**Table 4. Changes of tobacco and health knowledge in 2005-2010 by gender**

Knowledge issue	Gender	2005			2010			prevalence ratio (2010/2005)
		%	95%CI lower	95%CI upper	%	95%CI lower	95%CI upper	
SHS hazard	Men	24.6	21.9	27.2	90.6	89.7	91.5	3.7
	Women	32.2	29.5	34.8	95.7	95.0	96.3	3.0
Addiction	Men	39.2	36.1	42.2	98.2	97.8	98.6	2.5
	Women	41.4	38.6	44.1	98.9	98.6	99.2	2.4
Impotence	Men	10.7	8.8	12.6	54.0	52.5	55.6	5.1
	Women	9.9	8.2	11.6	56.3	54.7	57.8	5.7
Heart disease	Men	43.2	40.1	46.2	75.5	74.1	76.8	1.7
	Women	49.5	46.7	52.3	82.3	81.1	83.5	1.7

societies (Andreeva, 2008; Pampel, 2008) which was quite obvious until recently in women in Ukraine (Andreeva & Krasovsky, 2007). This latter pattern that people who have more money tend to spend more on alcohol or tobacco clearly fills into economic theories regarding any goods. It is still revealed in studies which show the association of pocket money and unhealthy behaviors (McLellan, Rissel, Donnelly, & Bauman, 1999). Cockerham et al. explored health lifestyles in other two post-Soviet republics, Kazakhstan and Kyrgyzstan, and found that such lifestyles are more positive in Kyrgyzstan despite the somewhat better economic situation in Kazakhstan, where the mortality crisis continues (Cockerham, Hinote, Abbott, & Haerpfer, 2004). After the start of economic crisis in 2008, Ukraine experienced decline in all-causes mortality and especially the portion of mortality related to alcohol use (Krasovsky, 2010).

### The tobacco epidemic development in men and women

As in many studies in other countries and earlier in Ukraine (Cockerham, Hinote, Abbott, & Haerpfer,

2005) it was seen that men are much more likely to be smokers than women. However, what is interesting with this regard is that the situation in Ukraine does not follow the earlier established trends in the development of the tobacco epidemic by gender. While in many high-income countries it was seen that the smoking prevalence in women kept increasing after the start of its decline in men (Lopez, Collishaw, & Piha, 1994), which was a byproduct of a lag in the adoption, diffusion, and abatement of smoking by women (Pampel, 2003b), in Ukraine such decline in women is greater than in men in terms of prevalence ratios and is quite similar when prevalence difference is compared over time. In fact, the suggested earlier 'convergence in male and female smoking' (Pampel, 2001) is not seen in Ukraine. Different social perception of normativeness of men's and women's health behaviors (Mahalik, Burns, & Syzdek, 2007) as well as different acceptance of male and female smokers may be a cause for such differences (Andreeva, 2011a). This again shows that societal and group norms and routine practices can adversely affect the health (Cockerham, 2000). The factor of 'cultural prohibition against

women smoking' was emphasized in a recent revision (Thun, Peto, Boreham, & Lopez, 2012) of the tobacco epidemic descriptive model which recognised the peculiarities of the epidemic development in low and middle-income countries.

Before the tobacco control measures were widely implemented in Ukraine, the situation developed in accordance with the earlier observed scenarios with smoking shift from concentration among young and highly educated women to older and less educated women (Pampel, 2003a). Tobacco industry targeted women in Ukraine in the same way as in other countries and was quite successful in that. However, highly educated women in Ukraine were also more responsive to the tobacco control measures as they were to the tactics of the tobacco industry in earlier years.

### Which countries are different

Some of the explanations listed above may be typical for the countries in transition or the Eastern-European countries in particular. Several peculiarities related to the issue of social disparities are typical for the post-socialist countries. Self-rated health was found to be

**Table 5. Changes of exposure to different types of tobacco advertising in 2005-2010 by gender**

Advertising media	Gender	2005			2010			prevalence ratio (2010/2005)
		%	95%CI lower	95%CI upper	%	95%CI lower	95%CI upper	
Billboards/Outdoor	Men	51.9	48.8	55.0	17.2	16.0	18.4	0.3
	Women	41.7	38.9	44.5	13.6	12.5	14.7	0.3
Newspaper/Magazine	Men	8.2	6.5	9.9	10.9	9.9	11.9	1.3
	Women	10.0	8.3	11.7	11.5	10.5	12.5	1.2
Point of Sale/Stores	Men	17.5	15.1	19.8	23.7	22.4	25.0	1.4
	Women	10.4	8.7	12.1	19.2	17.9	20.4	1.8
TV	Men	25.0	22.4	27.7	10.0	9.1	11.0	0.4
	Women	23.9	21.5	26.3	9.7	8.8	10.6	0.4



unrelated to health behaviors in Baltic countries contrary to the neighboring Finland (Kasmel et al., 2004). Cockerham et al. found health lifestyles to be unrelated to economic situation in post-Soviet countries of Central Asia (Cockerham, et al., 2004). In a study which compared East European students to Western European ones, they were shown to have less healthy lifestyles, to be less aware of the relationship between lifestyle factors (smoking, exercise, fat and salt consumption) and cardiovascular disease risk, and to have greater beliefs in uncontrollable influences (Steptoe & Wardle, 2001). This set of findings makes us hypothesize that with lack of knowledge on health impact of lifestyle factors provided to the population in the Soviet Union, and taking into account that the society was rather closed behind the 'iron curtain', social shaping of health behaviors did not occur in the countries of the former Soviet Union in same way as it happened in the West. For example, when there is no health communication or counseling showing that too much fat or salt is bad for health, it is difficult to expect that the society stratifies in terms of how much it adopts the idea and the behavior. One hypothesis suggested for the persistence of association between SES and health is that people who are relatively better off are more able to avoid risks by adopting currently available protective strategies (Link, Northridge, Phelan, & Ganz, 1998). Health behaviors which do not show much social gradient in post-Soviet countries may have been not among the 'currently available protective strategies'. It is suggested that when we develop the ability to control disease and death, the benefits of this new-found ability are distributed according to resources of knowledge, money, power, prestige, and benefi-

cial social connections (Phelan & Link, 2005). Obviously, limiting smoking behavior was not considered a 'new-found ability' in Soviet societies, and we still observe the consequences of such situation. Recent recognition of smoking as a health behavior which needs to be controlled could lead to unexpectedly quick decline in smoking prevalence.

Besides that, our earlier analysis of Ukrainian data showed that while physicians' advice to smokers is not widely used in Ukraine, it is to a larger extent provided to older smokers with higher dependence and those belonging to lower socioeconomic groups (Andreeva, 2010, 2011b). This could contribute to the smaller disparities revealed in Ukraine. Researchers in other countries were more likely to get the opposite results with physicians counseling smokers of higher SES groups (Houston, Scarinci, Person, & Greene, 2005).

Peculiarities of post-Soviet countries hypothesized here need to be further considered in research focused on other types of health behaviors which may facilitate understanding of those processes which resulted in SES gradients differing from high-income countries.

Policy implication of the conducted analysis is that even not very comprehensive tobacco control policies in poorer countries give much more results than concerted effort in many high-income countries where previously implemented policies and programs have already shown effects. Ukraine's example shows that the increase of the tobacco epidemic in women is not inevitable after the epidemic in men phases out. Other low and middle-income countries may take this scenario into account. Further research can be aimed at analyzing whether other non-western countries have

witnessed similar success in female smoking decline after implementing measures recommended by the Framework Convention on Tobacco Control.

The study design has several limitations. First, the three surveys were conducted with the use of different sampling techniques and different questionnaires. This poses limitations to the applicability of multivariate analysis and controlling for potential confounders. Besides, many socio-demographic characteristics which had to be controlled for were collected in a slightly different way. Still this is the best data available for Ukraine. Second, measuring changes over time implies the use of a comparison group which is hard to imagine in natural experiments resulting from national policy interventions. However, in our case, we have a perfect country for comparison. Russia is a neighboring country and a piece of the same former Soviet Union. In 2005, all the measures of smoking prevalence there were quite close to Ukraine. However, GATS data has shown that not much has changed in Russia by 2010 (Ministry of Health and Social Development of the Russian Federation, 2009) while significant changes have been observed in Ukraine.

## CONCLUSION

Comparison of certain tobacco control indicators in Ukraine in 2000, 2005 and 2010 shows that tobacco control policies implemented in the country since 2005 were beneficial for all social groups. Less educated groups in Ukraine were much more responsive to tobacco control policies than it was expected based on the findings from high-income countries. The overall smoking prevalence, as well as tobacco smoke and tobacco

advertising exposures were found to decline in parallel in different gender and education groups. Smoking prevalence among least educated women remains at a very low level. In terms of smoking prevalence, the only sign of disparity was lower smoking prevalence in men with university level of education. However, between 2005 and 2010 knowledge about tobacco-related health hazards increased more significantly in lower educated groups.

## ABOUT THE AUTHOR

Tatiana I. Andreeva, MD, PhD, School of public health, National University of Kyiv-Mohyla Academy, Kiev, Ukraine

E-mail: tatianandreeva@yandex.ru  
Telephone +38-050-4165200

## ACKNOWLEDGEMENTS

The surveys in 2005 and 2010 were conducted by the Kyiv International Institute of Sociology. Funds for the 2005 survey were provided by the Open Society Institute, and funds for the 2010 survey – by the Global Bloomberg Initiative to reduce tobacco use.

The presented analysis was not paid from any sources.

The author is grateful to the members of the Tobacco Research Network on Disparities (TReND) network whose reviews provided in 2011 helped to improve the paper; however, as the manuscript was lost in the online submission system of the journal where it was approved to be published, after one year without editorial decision it was withdrawn to be published in the TCPHEE.

The author declares to have no conflict of interest.

This paper was received September 20, 2012; accepted November 30, 2012; published December 23, 2012.

## REFERENCES

- Alvarez-Dardet, C., Montahud, C., & Ruiz, M. T. (2001). The widening social class gap of preventive health behaviours in Spain. *Eur J Public Health*, 11(2), 225-226.
- Andreeva, T. I. (2008). Socially disadvantaged groups and tobacco. Paper presented at the Summit of tobacco control leaders from Central and Eastern Europe and the Former Soviet Union countries.
- Andreeva, T. I. (2010). Smoking cessation aid to Ukrainian smokers, results of 2010 population survey (in Ukrainian). *Social Psychology*, 6(44), 149-156.
- Andreeva, T. I. (2011a). Difficulties in quitting smoking: gender stereotypes impact (in Ukrainian). *Social Psychology*, 3(47), 98-108.
- Andreeva, T. I. (2011b). Who in Ukraine gets physician's advice to quit smoking? Results of 2005 nationwide survey (in Ukrainian). *Grani*, 1(75), 131-136.
- Andreeva, T. I., & Krasovsky, K. S. (2007). Changes in smoking prevalence in Ukraine in 2001-5. *Tob Control*, 16(3), 202-206.
- Andreeva, T. I., & Krasovsky, K. S. (2010). Health awareness impact of tobacco pack health warnings in Ukraine (in Ukrainian). *Naukovi zapysky. Sociology*, 1(09), 72-77.
- Andreeva, T. I., & Krasovsky, K. S. (2011). Recall of tobacco pack health warnings by the population in Ukraine and its association with the perceived tobacco health hazard. *Int J Public Health*, 56(3), 253-262.
- Andreeva, T. I., Krasovsky, K. S., & Kharchenko, N. M. (2009). Correlates and recent changes of smoking prevalence among adults in Ukraine (in Ukrainian). *East European Journal of Public Health*, 1(1), 50-57.
- Andreeva, T. I., Krasovsky, K. S., & Semenova, D. S. (2007). Correlates of smoking initiation among young adults in Ukraine: a cross-sectional study. *BMC Public Health*, 7, 106.
- Cockerham, W. C. (2000). Health lifestyles in Russia. *Soc Sci Med*, 51(9), 1313-1324.
- Cockerham, W. C., Hinote, B. P., Abbott, P., & Haerpfer, C. (2004). Health lifestyles in central Asia: the case of Kazakhstan and Kyrgyzstan. *Soc Sci Med*, 59(7), 1409-1421.
- Cockerham, W. C., Hinote, B. P., Abbott, P., & Haerpfer, C. (2005). Health lifestyles in Ukraine. *Soz Praventivmed*, 50(4), 264-271.
- Curtin, F., Morabia, A., & Bernstein, M. (1997). Smoking behavior in a Swiss urban population: the role of gender and education. *Prev Med*, 26(5 Pt 1), 658-663.
- Fagan, P., King, G., Lawrence, D., Petrucci, S. A., Robinson, R. G., Banks, D., et al. (2004). Eliminating tobacco-related health disparities: directions for future research. *Am J Public Health*, 94(2), 211-217.
- Fagan, P., Moolchan, E. T., Lawrence, D., Fernander, A., & Ponder, P. K. (2007). Identifying health disparities across the tobacco continuum. *Addiction*, 102, 5-29.
- Fong, C. W., Bhalla, V., Heng, D., Chua, A. V., Chan, M. L., & Chew, S. K. (2007). Educational inequalities associated with health-related behaviours in the adult population of Singapore. *Singapore Med J*, 48(12), 1091-1099.
- Global Tobacco Surveillance System Collaborative Group. (2011). *Tobacco questions for surveys: a subset of key questions from the Global Adult Tobacco Survey (GATS)* (2nd ed.). Atlanta Centers for Disease Control and Prevention.
- Great Britain: Department of Health. (2010). *Healthy lives, healthy people: our strategy for public health in England* (Vol. 7985). London: Stationery Office.
- Harman, J., Graham, H., Francis, B., & Inskip, H. M. (2006). Socioeconomic gradients in smoking among young women: A British survey. *Soc Sci Med*, 63(11), 2791-2800.
- Houston, T. K., Scarinci, I. C., Person, S. D., & Greene, P. G. (2005). Patient

- smoking cessation advice by health care providers: the role of ethnicity, socioeconomic status, and health. *Am J Public Health*, 95(6), 1056-1061.
- Hu, L., Sekine, M., Gaina, A., Nasermoaddeli, A., & Kagamimori, S. (2007). Association of smoking behavior and socio-demographic factors, work, lifestyle and mental health of Japanese civil servants. *J Occup Health*, 49(6), 443-452.
- Jitnarin, N., Kosulwat, V., Rojroongwasinkul, N., Boonpraderm, A., Haddock, C. K., & Poston, W. S. (2010). Socioeconomic Status and Smoking Among Thai Adults: Results of the National Thai Food Consumption Survey. *Asia Pac J Public Health*.
- Kasmel, A., Helasoja, V., Lipand, A., Prattala, R., Klumbiene, J., & Pudule, I. (2004). Association between health behaviour and self-reported health in Estonia, Finland, Latvia and Lithuania. *Eur J Public Health*, 14(1), 32-36.
- Katainen, A. (2010). Social class differences in the accounts of smoking – striving for distinction? *Sociology of Health & Illness*, 32(7), 1087-1101.
- Krasovsky, K. (2010). Impact of the economic crisis and alcohol consumption decline on Ukraine population mortality rate reduction in 2009 (in Ukrainian). *Ukraine. Health of the nation*, (3 (15)), 54-57.
- Krasovsky, K., Andreeva, T., Krisanov, D., Mashliakivsky, M., & Rud, G. (2002). *The Economics of tobacco control in Ukraine from the public health perspective*. Kiev.
- Link, B. G. (2008). Epidemiological Sociology and the Social Shaping of Population Health. *Journal of Health and Social Behavior*, 49(4), 367-384.
- Link, B. G., Northridge, M. E., Phelan, J. C., & Ganz, M. L. (1998). Social epidemiology and the fundamental cause concept: on the structuring of effective cancer screens by socioeconomic status. *Milbank Q*, 76(3), 375-402, 304-375.
- Link, B. G., & Phelan, J. (2009). The social shaping of health and smoking. *Drug Alcohol Depend*, 104 Suppl 1, S6-10.
- Link, B. G., Phelan, J. C., Miech, R., & Westin, E. L. (2008). The resources that matter: fundamental social causes of health disparities and the challenge of intelligence. *J Health Soc Behav*, 49(1), 72-91.
- Lopez, A. D., Collishaw, N. E., & Piha, T. (1994). A descriptive model of the cigarette epidemic in developed countries. *Tob Control*, 3(3), 242-247.
- Lund, K. E., & Lund, M. (2005). Smoking and social inequality in Norway 1998-2000 (in Norwegian). *Tidsskr Nor Laegeforen*, 125(5), 560-563.
- Mahalik, J. R., Burns, S. M., & Syzdek, M. (2007). Masculinity and perceived normative health behaviors as predictors of men's health behaviors. *Social Science & Medicine*, 64(11), 2201-2209.
- Martinez, E., Kaplan, C. P., Guil, V., Gregorich, S. E., Mejia, R., & E, J. P.-S. (2006). Smoking Behavior and Demographic Risk Factors in Argentina: A Population-Based Survey. *Prev Control*, 2(4), 187-197.
- McLellan, L., Rissel, C., Donnelly, N., & Bauman, A. (1999). Health behaviour and the school environment in New South Wales, Australia. *Social Science & Medicine*, 49(5), 611-619.
- Ministry of Health and Social Development of the Russian Federation. (2009). *Russian Federation Global Adult Tobacco Survey Country Report*.
- Ministry of Health of Ukraine. (2010). *Ukraine Global Adult Tobacco Survey country report* Kiev: Ministry of Health of Ukraine.
- Pampel, F. C. (2001). Cigarette diffusion and sex differences in smoking. *J Health Soc Behav*, 42(4), 388-404.
- Pampel, F. C. (2003a). Age and education patterns of smoking among women in high-income nations. *Soc Sci Med*, 57(8), 1505-1514.
- Pampel, F. C. (2003b). Declining sex differences in mortality from lung cancer in high-income nations. *Demography*, 40(1), 45-65.
- Pampel, F. C. (2008). Differences in the influence of family background and social activities on smoking of minority and white high school seniors, 1976-2004. *J Immigr Minor Health*, 10(6), 507-515.
- Pampel, F. C., Krueger, P. M., & Denney, J. T. (2010). Socioeconomic Disparities in Health Behaviors. *Annual Review of Sociology*, 36(1), 349-370.
- Phelan, J. C., & Link, B. G. (2005). Controlling disease and creating disparities: a fundamental cause perspective. *J Gerontol B Psychol Sci Soc Sci*, 60 Spec No 2, 27-33.
- Phelan, J. C., Link, B. G., & Tehranifar, P. (2010). Social Conditions as Fundamental Causes of Health Inequalities. *Journal of Health and Social Behavior*, 51(1 suppl), S28-S40.
- Ross, C. E., & Wu, C.-I. (1995). The Links Between Education and Health. *American Sociological Review*, 60(5), 719-745.
- Ross, H., Stoklosa, M., & Krasovsky, K. (2012). Economic and public health impact of 2007-2010 tobacco tax increases in Ukraine. *Tob Control*, 21(4), 429-435.
- Steptoe, A., & Wardle, J. (2001). Health behaviour, risk awareness and emotional well-being in students from Eastern Europe and Western Europe. *Social Science & Medicine*, 53(12), 1621-1630.
- The International Centre for Policy Studies. (2005). *Tobacco in Ukraine: national survey of knowledge, attitudes and behavior. A survey of Ukrainian population*. Kiev: The International Centre for Policy Studies.
- Thun, M., Peto, R., Boreham, J., & Lopez, A. D. (2012). Stages of the cigarette epidemic on entering its second century. *Tob Control*, 21(2), 96-101.
- Verburg, J. A., Toet, J., & van Ameijden, E. J. (2005). Smoking, alcohol and drug use in Utrecht, The Netherlands, risk groups and socioeconomic differences in 1999 and 2003 [In Dutch]. *Ned Tijdschr Geneesk*, 149(38), 2113-2118.
- WHO. (1998). *Guidelines for controlling and monitoring the tobacco epidemic*. Geneva, Switzerland: WHO.