Prevalence of Smoking in 8 Countries of the Former Soviet Union: Results From the Living Conditions, Lifestyles and Health Study

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Objectives. We sought to provide comparative data on smoking habits in countries of the former Soviet Union.

Methods. We conducted cross-sectional surveys in 8 former Soviet countries with representative national samples of the population 18 years or older.

Results. Smoking rates varied among men, from 43.3% to 65.3% among the countries examined. Results showed that smoking among women remains uncommon in Armenia, Georgia, Kyrgyzstan, and Moldova (rates of 2.4%–6.3%). In Belarus, Ukraine, Kazakhstan, and Russia, rates were higher (9.3%–15.5%). Men start smoking at significantly younger ages than women, smoke more cigarettes per day, and are more likely to be nicotine dependent.

Conclusions. Smoking rates among men in these countries have been high for some time and remain among the highest in the world. Smoking rates among women have increased from previous years and appear to reflect transnational tobacco company activity. (*Am J Public Health.* 2004;94:2177–2187)

In 1990, it was estimated that a 35-year-old man in the former Soviet Union had twice the risk of dying from tobacco-related causes before the age of 70 years as a man in the European Union (20% vs 10%).[1] In the former Soviet Union, 56% of male cancer deaths and 40% of all deaths are attributed to tobacco, compared with 47% and 35%, respectively, in the European Union.[1] Rates of circulatory disease among both men and women are approximately triple those in the European Union.[2] Moreover, tobacco-related mortality continues to increase in the former Soviet Union, while it has stabilized or declined in the European Union as a whole.[1]

Despite these deplorably high levels of tobacco-related mortality, relatively little is known about smoking prevalence rates in the region. Virtually no recent or reliable data exist for the central Asian countries (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan),[2,3] and recent surveys conducted in Georgia have been limited to the capital, Tbilisi.[4,5] Data from elsewhere in the Caucasus (Armenia, Azerbaijan) are scarce,[6] and historical figures[7] are inconsistent with later findings, leading authors to rely on anecdotal reports of smoking rates.[8]

Historical[3] and more recent data, derived largely from Russia,[9] Ukraine,[10] Belarus,[11] and the Baltic states,[12] show—perhaps unsurprisingly, given the mortality figures just described—that smoking rates among men are high (45%–60%) while rates are far lower among women (1%–20%).[2] The higher rates previously seen among Estonian women are now being matched by rates among women in the other Baltic states[2,12,13] and by women in other urban areas.[9,10] Unfortunately, other than the Baltic states, few countries collect information using similar data collection tools, thereby precluding accurate between-country comparisons.

These issues underlie the need in the former Soviet Union for comparable and accurate data on smoking prevalence, given that such data are widely recognized as a prerequisite for the development of effective public health policies.[14–16] This need is made more urgent by the profound changes occurring as a result of the former Soviet Union's recent economic transition and, more specifically, by the changes taking place in its tobacco industry.[17] The latter were first felt as soon as these formerly closed markets opened, with a rapid influx of cigarette imports and advertising.[18–20] Later, as part of the large-scale privatization of state assets, most of the newly independent states privatized their tobacco industries, and the transnational tobacco companies established a local manufacturing presence, investing more than $2.7 billion in 10 countries of the former Soviet Union between 1991 and 2000.[21] Evidence from the industry's previous entry into Asia suggests that these changes are likely to have a significant upward impact on cigarette consumption.[22,23]

In response to these and other health and social issues facing the region, a major research project—the Living Conditions, Lifestyles and Health Study—was commissioned as part of the European Union's Copernicus program. This investigation involved surveys conducted in 8 of the 15 newly independent states: Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, and Ukraine.[24] We present data on smoking prevalence, including age- and gender-specific smoking rates, age at initiation of smoking, and indicators of nicotine dependence.

METHODS

Study Population and Sampling Procedures

In autumn 2001, quantitative cross-sectional surveys were conducted in each country by organizations with expertise in survey research using standardized methods[25] (described in detail elsewhere[26]). In brief, each survey sought to include representative samples of the national adult population 18 years or older, although a few small regions had to be excluded as a result of geographic inacces-

sibility, sociopolitical situation, or prevailing military action: Abkhazia and Ossetia in Georgia, the Transdniester region and the municipality of Bender in Moldova, the Chechen and Ingush republics, and autonomous districts located in the far north of the Russian Federation.

Samples were selected via multistage random sampling with stratification by region and area. Within each primary sampling unit, households were selected according to standardized random route procedures; the exception was Armenia, where household lists were used to provide a random sample. Within each household, the adult with the birthday nearest to the date of the survey was selected to be interviewed. At least 2000 respondents were included in each country; 4006 residents of the Russian Federation and 2400 residents of Ukraine were interviewed, reflecting the larger and more diverse populations of these countries.

Questionnaire Design

The first draft of the questionnaire was created, in consultation with country representatives, from preexisting surveys conducted in other transition countries[9,10,12] and from New Russia Barometer surveys[27] adjusted to national contexts. It was developed in English, translated into national languages, back-translated to ensure consistency, and pilot tested in each country. Trained interviewers administered the questionnaire in respondents' homes.

Statistical Analyses

Stata (Version 6; Stata Corp, College Station, Tex) was used to analyze the data. As a means of reducing the skewness of their distribution, the continuous variables of age at smoking initiation and smoking duration were transformed, via log-normal transformations, before analyses were conducted; however, they were returned to their original units in computing results.

Current smokers were defined as respondents reporting currently smoking at least 1 cigarette per day. We calculated age- and gender-specific smoking prevalence rates for each country. Given the negative health effects of early initiation, we examined age at smoking initiation among current smokers, as well as number of cigarettes smoked. We assessed level of nicotine dependence, an indication of smokers' ability or inability to quit, by identifying the percentage of current smokers who smoked more than 20 cigarettes per day and smoked within an hour of waking. This level of use is equivalent to a score of 3 or more on the abbreviated Fagerstrom dependency scale[28,29] and indicates moderate (score of 3 or 4) to severe (score of 5 or above) dependency.

Within each country, gender differences in smoking habits were assessed with χ^2 tests and 2-sample *t* tests; variations according to age group were estimated via logistic regression analyses in which the 18- to 29-year age group was the reference category. Logistic regression analyses with Russia as the baseline were used in making between-country comparisons in likelihood of smoking, while analyses of variance combined with Bonferroni multiple comparison tests were used in comparing geometric mean ages at smoking initiation. To allow for the large number of comparisons, we used 99% confidence intervals and set the significance level at .01.

RESULTS

Response Rates

A total of 18 428 individuals were surveyed. Response rates (calculated from the total number of households for which an eligible person could be identified) varied from 71% to 88% among the countries included. Rates of nonresponse for individual items were very low (e.g., 0.03% for current smoking and 0.5% for education level).

Sample Characteristics and Representativeness

The samples clearly reflected the diversity of the region and were broadly representative of their overall populations (Table 1). Comparisons of the present data and official data are potentially limited by the failure of some of the country data to fully capture posttransition migration and other factors,[30] but they suggest slight underrepresentations of men in Armenia and Ukraine, of the urban population in Armenia, and of the rural population in Kyrgyzstan. Age group comparisons among the respondents 20 years or older suggested a tendency for the oldest age group to be overrepresented at the expense of the youngest age group, particularly in Armenia, Moldova, and Ukraine.

Smoking Prevalence

Rates of male smoking were high. In many of the countries surveyed, almost 80% of male respondents reported a history of smoking (Table 2). Rates of current smoking were lowest in Moldova (43.3%) and Kyrgyzstan (51.0%) and highest in Kazakhstan (65.3%), Armenia (61.8%), and Russia (60.4%). Smoking rates in Russia were not distinguishable from those in Kazakhstan, Armenia, or Belarus but were significantly higher than those observed in Moldova, Kyrgyzstan, Ukraine, and Georgia ($P<.01$; data not shown).

Rates among women were far lower (gender comparisons were significant at the .001 level in all countries) and somewhat more variable, ranging from 2.4% to 15.5%; the lowest rates were seen in Armenia, Moldova, and Kyrgyzstan and the highest in Russia, Belarus, and Ukraine. Smoking among women in Russia was significantly more prevalent than among women in all of the other countries under study ($P<.01$) although adjusting for age removed the difference between Russia and Belarus (data not shown).

The relationship between smoking and age varied by gender. Among men, with the exception of those residing in Moldova, smoking prevalence rates varied little between the ages of 18 and 59 years but then declined more markedly in men above the age of 60 years (Table 2, Figure 1). This decline with age was accounted for by increases in the older groups in terms of percentages of former smokers and never smokers. Among women, the overall trend was a decrease in reports of both current and former smoking with increasing age; very low smoking rates were observed in the oldest age group (rates of reported lifetime smoking varied from 0.8%–3.9%). However, closer inspection of the data suggested that the countries could be divided into 2 groups. In the first group (Russia, Belarus, Ukraine, and Kazakhstan), rates of current and ever smoking implied that initiation of smoking had increased rapidly between generations, especially in the youngest age group (Table 2, Figure 1). In the second group (Armenia, Georgia, Kyrgyzstan, and Moldova), the age trends were less obvious

TABLE 1—Characteristics of Samples and Countries in the Living Conditions, Lifestyles and Health Study: 8 Countries of the Former Soviet Union, 2001

Characteristic	AR	BY	GE	KZ	KG	MD	RU	UA
				Sample				
Response rate, %	88	73	88	82	71	81	73	76
Gender								
Male, %	40.3	44.1	45.7	44.4	45.0	45.1	43.5	38.8
Men aged ≥20 y, %	40.7	43.9	45.6	44.1	45.6	44.9	43.2	38.6
No.	2000	2000	2022	2000	2000	2000	4006	2400
Age group, y, %								
20–29	15.4	16.9	13.9	21.9	26.7	14.5	16.5	14.6
30–39	21.6	19.2	20.3	25.8	26.0	20.1	19.3	16.4
40–49	24.0	21.6	21.9	21.5	21.4	23.1	20.9	17.9
50–59	11.1	14.5	16.3	12.0	10.1	16.4	15.4	15.5
≥60	28.0	27.9	27.6	18.8	15.9	26.0	27.9	35.5
No. aged ≥20	1940	1922	1975	1890	1899	1945	3828	2324
No. aged 18–19	60	78	47	110	101	55	178	76
Interview location, %								
State/regional capital	44.0	33.9	41.4	27.0	27.5	30.4	35.7	31.5
Other city/small town	17.0	34.8	15.6	25.4	13.5	11.6	37.1	36.4
Village	39.0	31.4	43.0	47.6	59.0	58.1	27.3	32.1
No.	2000	2000	2022	1850	2000	2000	4006	2400
Reported nationality, %								
Nationality of country[a]	97.3	80.1	90.2	36.3	68.6	76.7	82.4	77.7
Russian	0.8	12.1	1.3	41.5	18.0	7.7	. . .	16.5
Other	1.9	7.8	8.5	22.1	13.5	15.7	17.6	5.8
No.	2000	1979	2021	1979	1997	1980	3967	2371
Education, %								
Secondary education or less	49.1	49.4	33.8	35.7	48.3	52.2	43.2	44.2
Secondary vocational or some college	30.4	34.2	32.7	43.5	32.7	32.7	35.7	36.1
College	20.5	16.4	33.6	20.8	19.0	15.2	21.1	19.7
No.	1996	1984	1996	1995	1996	1984	4004	2381
				Country data[b]				
Midyear population, 2001, thousands	3788	9971	5238	14821	4927	4254	144387	49111
Gross national product per capita, 2001, $	560	1190	620	1360	280	380	1750	720
Men aged ≥20 y, 2000, %	47.5	45.4	46.4	46.6	47.9	46.3	45.3	44.8
Urban population, 2001, %	67.3	69.6	56.5	55.9	34.4	41.7	72.9	68.0
Age group, y, % of total ≥20								
20–29	23.2	19.3	20.6	26.0	30.5	23.1	19.6	19.4
30–39	24.2	20.3	21.1	23.7	24.7	20.3	19.6	19.0
40–49	22.5	21.5	19.5	21.4	19.6	22.7	22.4	19.8
50–59	10.3	12.6	12.7	10.9	9.0	13.6	13.3	14.2
≥60	19.7	26.4	26.2	18.0	16.2	20.3	25.1	27.6
Unemployment rate, %[c]	11.7	2.3	11.1	2.9	3.2	2.0	13.4	5.8
Tobacco industry state owned (SO) or privatized (P)	P	SO	P	P	P	SO	P	P
Foreign direct investment in tobacco industry, end of 2000, $ millions[d]	8	0	0	440	. . .	0	1719	152.9
Foreign direct investment in tobacco industry per capita × 1000[d]	0.002	0.000	0.000	0.030	. . .	0.000	0.012	0.003

Note. AR = Armenia; BY = Belarus; GE = Georgia; KZ = Kazakhstan; KG = Kyrgyzstan; MD = Moldova; RU = Russia; UA = Ukraine.
[a]Mean Armenians in Armenia, Belarussians in Belarus, Georgians in Georgia, Kazakhs in Kazakhstan, Kirghiz in Kyrgyzstan, Moldovans/Romanians in Moldova, Russians in Russia, and Ukrainians in Ukraine.
[b]Data sources were European Health for All Database, January 2003; Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat.
[c]In 1999 for Russia, 2000 for Armenia and Ukraine, and 2001 for the other countries.
[d]Data from Gilmore and McKee[21]; these are minimum investment figures.

TABLE 2—Smoking Prevalence Rates, by Country, Gender, and Age Group in 8 Countries of the Former Soviet Union, 2001

	Male								Female								Gender Difference in Current Smoking, P^b
		All Age Groups		18–29 y,	30–39 y,	40–49 y,	50–59 y,	≥60 y,		All Age Groups		18–29 y,	30–39 y,	40–49 y,	50–59 y,	≥60 y,	
	No.	%	99% CI	%	%	%	%	%	No.	%	99% CI	%	%	%	%	%	
Armenia																	
Current smoker	498	61.8	56.2, 67.4	62.5	76.8	68.3	67.1	44.4	28	2.4	−5.0, 9.7	0.9	3.1	3.9	2.9	1.0	<.001
Former smoker	120	14.9	6.5, 23.3	8.3	5.5	14.2	17.1	25.1	7	0.6	−6.8, 8.0	0.9	0.4	0.4	0.7	0.7	
Never smoker	188	23.3	15.4, 31.3	29.2	17.7	17.5	15.8	30.5	1159	97.1	95.8, 98.3	98.1	96.5	95.7	96.4	98.4	
Odds of current smoking				1.00	1.98	1.29	1.22	0.48				1.00	3.43	4.3	3.15	1.05	
P					.006	.272	.499	.001					.121	.059	.19	.952	
Belarus																	
Current smoker	495	56.1	50.4, 61.9	58.2	65.3	59.8	60.2	40.3	135	12.1	4.9, 19.3	30.4	18.5	12.7	3.1	0.9	<.001
Former smoker	125	14.2	6.1, 22.2	9.2	12.1	12.9	11.0	23.9	60	5.4	−2.1, 12.9	13.5	7.7	2.3	4.4	1.5	
Never smoker	262	29.7	22.4, 37.0	32.7	22.5	27.3	28.8	35.8	922	82.5	79.3, 85.8	56.0	73.9	85.1	92.5	97.6	
Odds of current smoking				1.00	1.35	1.07	1.08	0.49				1.00	0.52	0.33	0.07	0.02	
P					.159	.743	.726	<.001					<.001	<.001	<.001	<.001	
Georgia																	
Current smoker	491	53.3	47.4, 59.1	62.8	64.8	61.5	50.7	33.9	69	6.3	−1.2, 13.9	5.8	11.6	7.8	3.4	3.4	<.001
Former smoker	71	7.7	−0.5, 15.9	2.0	4.4	4.5	10.4	14.5	10	0.9	−6.8, 8.7	2.3	1.4	1.3	0.0	0.0	
Never smoker	360	39.1	32.4, 45.7	35.1	30.8	34.0	38.9	51.6	1012	92.8	90.7, 94.9	91.9	87.0	90.9	96.6	96.6	
Odds of current smoking				1.00	1.09	0.94	0.61	0.30				1.00	2.13	1.38	0.58	0.57	
P					.707	.799	.037	<.001					.051	.426	.295	.219	
Kazakhstan																	
Current smoker	579	65.3	60.2, 70.4	66.0	72.7	65.9	64.2	50.0	103	9.3	1.9, 16.6	16.1	10.9	11.2	3.4	0.4	<.001
Former smoker	119	13.4	5.4, 21.5	7.6	9.5	16.2	18.4	24.2	48	4.3	−3.2, 11.9	5.8	7.8	4.3	0.9	0.4	
Never smoker	189	21.3	13.6, 29.0	26.4	17.8	17.9	17.4	25.8	962	86.4	83.6, 89.3	78.1	81.3	84.6	95.8	99.1	
Odds of current smoking				1.00	1.37	1.00	0.92	0.52				1.00	0.64	0.66	0.18	0.02	
P					.111	.982	.744	.003					.087	.113	.002	<.001	
Kyrgyzstan																	
Current smoker	457	51.0	44.9, 57.0	56.2	60.4	49.8	50.0	25.0	49	4.5	−3.1, 12.1	4.2	5.4	6.0	4.9	1.7	<.001
Former smoker	79	8.8	0.6, 17.0	4.9	5.5	8.3	6.8	25.8	22	2.0	−5.7, 9.7	2.7	1.8	2.5	0.0	1.7	
Never smoker	361	40.3	33.6, 46.9	39.0	34.1	42.0	43.2	49.2	1022	93.5	91.5, 95.5	93.1	92.8	91.5	95.1	96.7	
Odds of current smoking				1.00	1.19	0.77	0.78	0.26				1.00	1.31	1.45	1.18	0.39	
P					.353	.166	.313	<.001					.474	.357	.759	.140	

Continued

TABLE 2—*Continued*

Moldova																
Current smoker	390	43.3	36.8, 49.8	62.6	52.4	44.9	38.3	24.7	43	3.9	−3.7, 11.5	6.0	7.7	2.5	3.6	1.1	<.001
Former smoker	125	13.9	5.9, 21.8	6.5	10.1	13.2	16.9	20.6	13	1.2	−6.5, 8.9	3.9	1.4	0.8	0.6	0.0	
Never smoker	386	42.8	36.4, 49.3	31.0	37.5	42.0	44.8	54.8	1043	94.9	93.1, 96.7	90.1	91.0	96.7	95.8	99.0	
Odds of current smoking				1.00	0.66	0.49	0.37	0.20				1.00	1.29	0.39	0.59	0.16	
P					.065	.001	<.001	<.001					.526	.070	.304	.006	
Russia																	
Current smoker	1052	60.4	56.5, 64.3	66.4	69.7	68.4	59.9	42.3	348	15.5	10.5, 20.5	30.6	23.8	13.1	13.0	2.5	<.001
Former smoker	308	17.7	12.1, 23.3	10.1	13.6	11.6	18.5	31.9	135	6.0	0.7, 11.3	11.2	7.8	6.4	5.1	1.4	
Never smoker	381	21.9	16.4, 27.3	23.5	16.8	19.9	21.6	25.9	1768	78.5	76.0, 81.1	58.2	68.5	80.5	81.9	96.0	
Odds of current smoking				1.00	1.16	1.10	0.75	0.37				1.00	0.71	0.34	0.34	0.06	
P					.360	.558	.910	<.001					.025	<.001	<.001	<.001	
Ukraine																	
Current smoker	488	52.5	46.7, 58.4	61.9	65.2	56.5	59.5	35.7	162	11.1	4.7, 17.4	32.9	15.3	9.2	8.7	1.0	<.001
Former smoker	157	16.9	9.2, 24.6	11.4	6.5	14.1	13.0	28.3	40	2.7	−3.9, 9.4	5.4	3.7	3.9	2.2	0.8	
Never smoker	284	30.6	23.5, 37.6	26.7	28.3	29.4	27.5	36.0	1261	86.2	83.7, 88.7	61.7	81.0	86.9	89.1	98.3	
Odds of current smoking				1.00	1.15	0.80	0.90	0.34				1.00	0.37	0.21	0.19	0.02	
P					.549	.297	.671	<.001					<.001	<.001	<.001	<.001	
Total[a]																	
Current smoker	4417	55.5	53.5, 57.4	62.1	65.9	59.4	56.2	37.0	846	8.1	5.7, 10.5	15.9	12.0	8.3	5.4	1.5	
Former smoker	1070	13.4	10.7, 16.1	7.5	8.4	11.9	14.0	24.3	301	2.9	0.4, 5.4	5.7	4.0	2.7	1.7	0.8	
Never smoker	2479	31.1	28.7, 33.5	30.4	25.7	28.7	29.8	38.7	9274	89.0	88.2, 89.8	78.4	84.0	89.0	92.9	97.7	
Odds of current smoking				1.00	1.19	0.91	0.76	0.36				1.00	0.70	0.45	0.34	0.08	
P					.018	.155	<.001	<.001					<.001	<.001	<.001	<.001	
Significance of between-country differences in current smoking[b]		<.001		.195	<.001	<.001	<.001	<.001		<.001		<.001	<.001	<.001	<.001	.032	

Note. CI = confidence interval.
[a]Average, assuming the same number of respondents in each country.
[b]Results of χ^2 test on binary variable current versus never and former smokers.

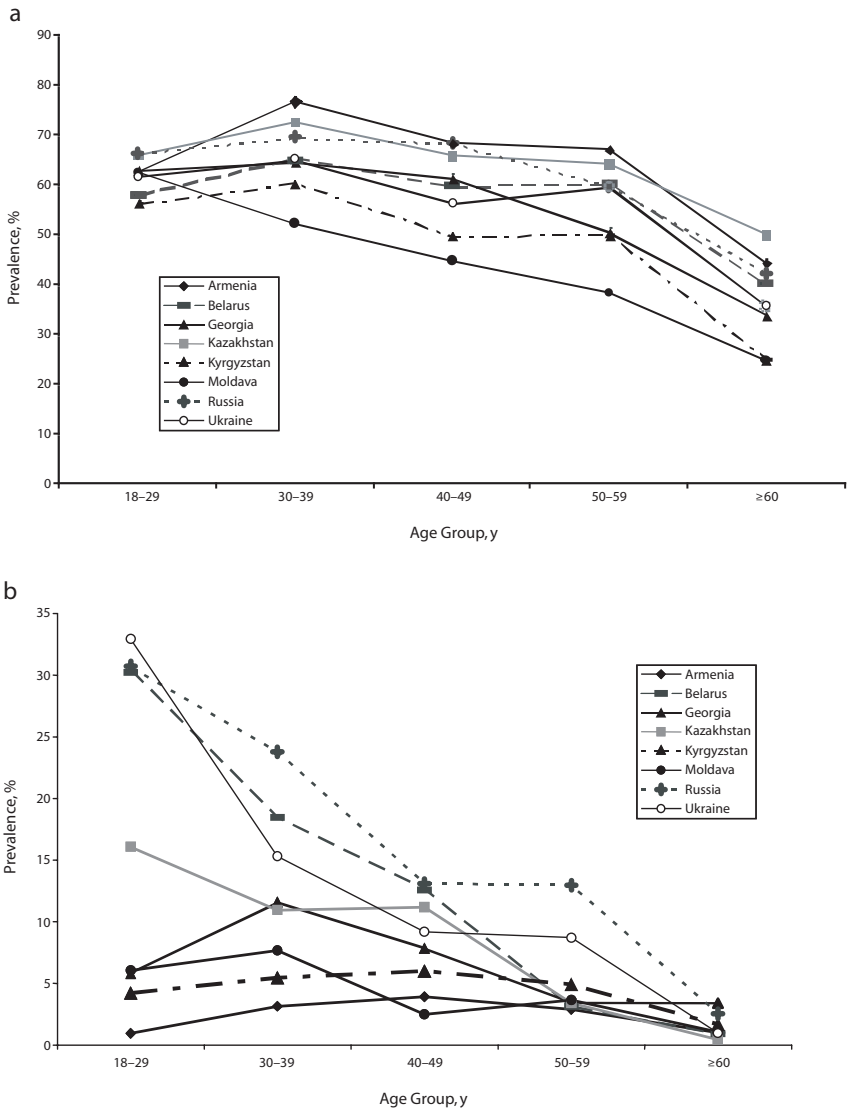

FIGURE 1—Current (a) male and (b) female smoking prevalence rates, by age group.

and were nonsignificant (with the exception of the comparison of the oldest and youngest age groups in Moldova).

Age at Initiation

The majority of male smokers reported that they began smoking before the age of 20 years, and, on average, a quarter reported that they began in childhood (Table 3). Far fewer women reported beginning in childhood, and sizable percentages began after the age of 20 years; for example, 86% of women residing in Armenia and more than 40% of women residing in Georgia, Kyrgyzstan, and Moldova reported that they initiated smoking after this age. These gender differences were significant in all of the countries under study.

Differences also were observed between countries; in Belarus, Kazakhstan, Russia, and Ukraine, geometric mean ages at smoking initiation were younger than 18 years among men and younger than 20 years among women, compared with older ages at smoking initiation elsewhere. Overall, between-country differences were significant for both women and men ($P<.001$); however, Bonferroni multiple comparisons showed that there were significant differences among women only in comparisons involving Armenia and countries other than Georgia and Moldova ($P<.01$; data not shown). Among men, significantly younger ages at initiation were observed in Russia and Ukraine versus Armenia, Georgia, Kyrgyzstan, and Moldova; in Belarus versus Armenia and Kyrgyzstan; and in Kazakhstan versus Kyrgyzstan (all $P<.01$; data not shown).

Amount Smoked and Nicotine Dependence

Men were found to smoke more cigarettes than women; the majority of men smoked 10 or more cigarettes per day, while most women smoked fewer than 10 per day. Between-gender differences in percentages of respondents smoking more than 20 cigarettes per day were significant only in the case of Belarus, Kazakhstan, Russia, and Ukraine ($P<.001$).

The majority of smokers reported smoking their first cigarette within an hour of waking, although, in all countries other than Georgia, a far higher proportion of men than women did so ($P<.01$). Thus, men were more likely to be moderately to severely dependent on nicotine, although gender differences were significant only for Belarus, Kazakhstan, Russia, and Ukraine.

DISCUSSION

The surveys conducted in this study provide important new data on the prevalence of smoking in 8 countries representing more than four fifths of the population of the former Soviet Union. In the case of some of these countries, these data represent the first accurate, countrywide smoking prevalence data reported. In addition, they provide some of the first truly comparative data for countries of the former Soviet Union other than the Baltic states,[31,32] and, because of the focus on obtaining accurate information on sample characteristics, they offer advantages over data available in public databases. Response rates were relatively high, and the samples were broadly representative of the overall country populations.

Study Limitations

The underrepresentation of men in Armenia and Ukraine should not have affected the gender-specific rates observed, but, as a result

TABLE 3—Smoking Characteristics of Current Smokers in 8 Countries of the Former Soviet Union, 2001

	AR, %	BY, %	GE, %	KZ, %	KG, %	MO, %	RU, %	UA, %	All,[a] %	Between-Country Comparison, *P*[b]
Age at smoking initiation, y										
Men										
Mean age	18.5	17.4	18.2	17.6	19.1	18.2	17.0	17.2	17.9	
Geometric mean age	17.8	16.6	17.7	17.1	18.6	17.6	16.2	16.2	17.2	<.001
<16	22.2	32.8	18.0	27.9	14.7	22.8	36.4	35.2	26.2	
16–20	56.8	54.2	66.0	57.0	61.8	59.9	49.8	48.5	56.7	<.001
>20	21.0	13.0	16.0	15.1	23.5	17.3	13.9	16.3	17.0	
No.	447	430	400	502	408	347	993	435	3962	
Women										
Mean age	28.0	18.9	22.7	20.7	21.5	23.0	20.9	21.2	22.1	<.001
Geometric mean age	27.0	18.5	21.3	19.9	20.7	21.5	19.8	19.9	21.1	
<16	0.0	20.0	18.5	15.4	12.5	22.9	13.1	15.1	14.7	<.001
16–20	14.3	56.7	38.5	50.6	43.8	22.9	52.6	57.2	42.1	
>20	85.7	23.3	43.1	34.1	43.8	54.3	34.4	27.6	43.3	
No.	28	120	65	91	48	35	329	152	868	
Between-gender comparison in geometric mean age[c]	<.001	.002	<.001	<.001	.002	<.001	<.001	<.001		
Number of cigarettes smoked daily										
Men										
1–2	1.8	3.4	1.9	4.5	15.4	8.2	2.4	4.6	5.3	
Up to 10	18.7	32.3	12.7	30.9	50.1	43.3	24.6	25.4	29.8	<.001
10–20	51.4	50.5	63.3	48.0	28.7	37.4	52.2	53.5	48.1	
>20	28.1	13.7	22.2	16.6	5.8	11.0	20.8	16.5	16.9	
Odds ratio for likelihood of smoking >20 cigarettes per day	1.487	0.606	1.085	0.756	0.234	0.471	1.00	0.753		
P	.002	.001	.539	.038	<.001	<.001		.049		
No.	498	495	482	579	449	390	1052	484	4429	
Women										
1–2	32.1	23.7	11.9	19.4	36.2	37.2	18.7	22.2	25.2	
Up to 10	28.6	48.9	29.9	53.4	46.8	41.9	56.6	45.7	44.0	.065
10–20	32.1	25.2	46.3	23.3	17.0	18.6	19.8	26.5	26.1	
>20	7.1	2.2	11.9	3.9	0.0	2.3	4.9	5.6	4.7	
Odds ratio for likelihood of smoking >20 cigarettes per day	1.50	0.44	2.64	0.79	. . .	0.46	1.00	1.15		
P	0.602	0.199	0.032	0.672	. . .	0.461		0.749		
No.	28	135	67	103	47	43	348	162	933	
Between-gender comparison of % smoking >20 cigarettes per day[d]	.015	.000	.053	.001	.090	.073	<.001	<.001		
Time when usually smoke first cigarette										
Men										
First 30 minutes after awakening	63.5	47.9	52.9	42.8	39.0	44.1	56.5	55.8	50.3	
First hour after awakening	24.9	40.4	34.0	46.6	39.4	38.2	34.3	33.3	36.4	<.001
Before midday meal	4.6	6.9	5.0	5.0	7.1	6.7	4.7	6.0	5.7	
After midday meal or in the evening	7.0	4.9	8.1	5.5	14.5	11.0	4.6	5.0	7.6	
Odds ratio for likelihood of smoking in first hour	0.77	0.77	0.67	0.86	0.37	0.47	1.00	0.83		
P	.140	.129	.021	.394	<.001	<.001		.292		
No.	498	495	480	579	449	390	1051	484	4426	

Continued

TABLE 3—*Continued*

Women										
First 30 minutes after awakening	50.0	31.9	44.6	35.0	27.7	14.3	33.7	27.8	33.1	
First hour after awakening	14.3	28.9	30.8	27.2	31.9	38.1	32.0	32.1	29.4	.278
Before midday meal	3.6	19.3	12.3	13.6	12.8	11.9	13.5	17.3	13	
After midday meal or in the evening	32.1	20.0	12.3	24.3	27.7	35.7	20.8	22.8	24.5	
Odds ratio for likelihood of smoking in first hour	0.94	0.81	1.60	0.86	0.77	0.57	1.00	0.78		
P	.879	.307	.129	.505	.409	.092		.203		
No.	28	135	65	103	47	42	347	162	929	
Between-gender comparison in % smoking in first hour[d]	<.001	<.001	.014	<.001	.004	<.001	<.001	<.001		
Moderate to heavy nicotine dependence (>20 cigarettes per day and smoking within first hour of awakening)										
Men	26.9	13.7	21.4	16.6	5.6	10.5	20.6	16.2	16.4	.000
Odds ratio for likelihood of moderate to severe dependency	1.42	0.62	1.05	0.77	0.23	0.45	1.00	0.74	0.8	
P	.005	.093	.142	.104	.000	.000		.042	.00	
No.	498	495	477	579	449	390	1051	483	4422	
Women	7.1	2.2	10.8	3.9	0.0	1.0	17.0	9.0	6.4	.139
Odds ratio for likelihood of moderate to severe dependency	1.49	0.44	2.34	0.78	. . .	0.47	1.00	1.14	1.0	
P	.605	.197	.071	.669	. . .	.473		.754	.3	
No.	28	135	65	103	47	42	347	162	929	
Between-gender dependency comparison[d]	.020	<.001	.045	.001	.097	.091	<.001	.001		

Note. AR = Armenia; BY = Belarus; GE = Georgia; KZ = Kazakhstan; KG = Kyrgyzstan; MD = Moldova; RU = Russia; UA = Ukraine.
[a]Average, assuming the same number of respondents in each country.
[b]Results of analyses of variance (geometric mean) and χ^2 tests (categorical variable) for mean age at smoking initiation; χ^2 test for no. of cigarettes smoked, time to first cigarette, and dependency.
[c]Results of *t* tests.
[d]Results of χ^2 tests.

of the urban/rural differences in the composition of the sample, prevalence rates in Kyrgyzstan (where urban areas were overrepresented) may have been overestimated, and prevalence rates in Armenia (where urban areas were underrepresented) may have been underestimated. However, these discrepancies were likely to affect only the data relating to female respondents.[9–11] The age group disparities noted were minor but would tend to lead to underestimates of smoking prevalence.

In addition, the surveys were based on self-reported smoking status; there was no independent biochemical validation, and thus the smoking rates observed may have been affected by reporting bias. Although there is concern on the part of some that self-reports of smoking status may produce underestimates of smoking levels, studies conducted in Western countries suggest that this technique is sensitive and specific; they also suggest that more accurate responses are provided in interviewer-administered questionnaires than in self-completed questionnaires.[33] The only study conducted in the former Soviet Union that has addressed this issue showed that, among individuals claiming to be nonsmokers, 13% (48/368) of women and 17% (12/375) of men in rural northwestern Russia were in fact, according to blood cotinine levels, likely to be smokers, compared with only 2% of men and women in Finland.[34] Given the far lower prevalence of smoking among women, this had disproportionately large effects on reported rates of smoking among women. Although our questionnaires were administered by interviewers in respondents' homes, potentially making it more difficult for respondents who smoked to deny doing so, we may have underestimated smoking prevalence rates, particularly in the case of women residing in areas where smoking remains culturally unacceptable.

A final shortfall of the present study was the failure to measure smokeless tobacco use, which is relatively common in parts of the former Soviet Union, mainly Azerbaijan, Tajikistan, and Turkmenistan. However, although chewing tobacco is used in some of the southern regions of Kyrgyzstan, cigarettes are the main form of tobacco used there as well as in all of the other countries in which surveys were conducted.[8,35]

Findings

The results of our study confirm that smoking rates among men in this region are among the highest in the world and higher than the maximum rates recorded in the United States at the peak of its epidemic; rates above 50% were observed in all countries other than

Moldova and reached 60% or more in Armenia, Kazakhstan, and Russia. Elsewhere in Europe, rates above 50% are seen only in Turkey (51%) and Slovakia (56%), and worldwide fewer than 20 countries report rates of more than 60%.[6]

In the case of men, the lower prevalence of current smokers and higher prevalence of never and former smokers among those 60 years or older probably reflect the disproportionate number of premature deaths among current smokers relative to never and former smokers. However, a cohort effect has been shown in the former Soviet Union, with those who were teenagers between 1945 and 1953 carrying forward lower smoking rates because cigarettes, like other consumer goods, were in short supply in the period of postwar austerity under Stalin.[36,37] This cohort effect is also thought to account for the unexpected current decline in male lung cancer deaths,[36] which must be set against the overall rise in male tobacco-related mortality[1] and, in particular, increases in the already staggeringly high number of cardiovascular deaths.[2]

In comparison with male smoking patterns, smoking among women is far less common, varies more between countries, and exhibits a different age-specific pattern. Although rates of lifetime smoking are below 4% among individuals older than 60 years in all 8 countries, in the 4 countries with the highest smoking rates among women (Belarus, Kazakhstan, Russia, and Ukraine), smoking is now significantly more common among members of the younger generations; risk ratios between the youngest and oldest age groups range from 12.2 to 37.3, compared with a range of 1.0 to 5.5 in the other 4 countries.

Lopez et al.[38] outlined a 4-stage model of the patterns of a smoking epidemic based on observations from Western countries. In this model, such an epidemic is described as involving an initial rise in male smoking followed by a rise in female smoking 1 to 2 decades later, after which each plateaus and then falls as a result of tobacco-related mortality, finally rising to a peak decades later. Our findings suggest that the former Soviet Union's tobacco epidemic may have developed differently. Male smoking has a long history in this region. The first accounts of tobacco smoking in Russia date from the 17th century,[39] papirossi (a type of cigarette, popular in the former Soviet Union, characterized by a long, hollow mouthpiece that can be twisted before smoking) were first mentioned in 1844,[39] and cigarette factories were first constructed later in the 19th century.[40,41] Historical data on smoking[3] and high male tobacco-related mortality rates[1] suggest that smoking among men has been at a high level for some time and, contrary to the predictions of the 4-stage model just mentioned, has failed to exhibit a postpeak decline.

Smoking among women remains relatively uncommon, and rates have been far slower to rise than would be expected given male rates in the former Soviet Union and trends observed in the West. Indeed, it appears that female rates began to increase only in the mid- to late 1990s, when transnational tobacco companies arrived with their carefully targeted marketing strategies.[18–20] Therefore, although the exact stage of the epidemic varies slightly between the countries of the former Soviet Union, overall we suggest that men have remained between stages 3 and 4, with high rates of both smoking and mortality, while women in some countries are at stage 1 and others at stage 2, the latter with more rapidly rising smoking rates. Although rates of cardiovascular disease have been increasing, this can largely be explained by risk factors other than tobacco (including diet and stress), and female lung cancer rates have yet to increase.

Comparisons between our results and previous data are problematic given that much of the information that exists is fragmentary, of uncertain quality, and rarely nationally representative. This is particularly the case in the central Asian and Caucasian states, although limited data from Armenia and Moldova gathered between 1998 and 2001 suggest few changes in smoking prevalence rates[2,6]; data from Kazakhstan suggest small increases from the 60% male and 7% female prevalence rates recorded in 1996.[2] More data are available for Belarus, Russia, and Ukraine. These data suggest that smoking rates in men have changed little,[2,10,11,42] although in Russia they appeared to rise between the 1970s and 1980s[2,3,7] and into the mid-1990s, with little subsequent change. Among women, rates appear to have increased in all 3 countries,[2,11] and Russian data suggest that although rates have been rising since the 1970s, increases were most notable during the 1990s.[3,7,9,43]

Between-gender and intercountry differences in smoking prevalence rates are reflected in other smoking indicators as well; for example, men are more likely than women to start smoking when they are young, to smoke more heavily, and to be nicotine dependent. Two separate groupings of countries appeared to emerge from the between-country comparisons: Belarus, Kazakhstan, Russia, and Ukraine, on one hand, and Armenia, Georgia, Kyrgyzstan, and Moldova, on the other. In addition to exhibiting higher smoking rates among women and more pronounced age-specific trends, the former group tended to show lower ages at smoking initiation (particularly in comparison with Armenia, Georgia, and Moldova) along with more marked gender differences in regard to number of cigarettes smoked per day and level of nicotine dependency.

The differences observed in this study suggest that smoking patterns in Armenia, Georgia, Moldova, and Kyrgyzstan are more traditional than those in Belarus, Kazakhstan, Russia, and Ukraine. This situation can be explained by the differing degree of transnational tobacco company penetration.[21,44] Industry in Moldova continues to be in the form of a state-owned monopoly; industry in Georgia and Armenia has been privatized, but this change was rather recent (occurring after 1997), and none of the major transnational tobacco companies have invested directly in those countries.[21] Kazakhstan, Russia, and Ukraine, by contrast, saw major investments from most major transnational tobacco companies beginning in the early 1990s. Belarus, which retains a state-owned monopoly system, and Kyrgyzstan, where the German cigarette manufacturer Reemtsma has invested, would therefore appear to be exceptions, with Belarus more typical of the countries with transnational tobacco company investments and Kyrgyzstan more typical of the countries without such investments. In Belarus, however, the state tobacco manufacturer has only a 40% market share, with smuggled and counterfeit brands accounting for an additional 40% of this share. The importance the transnational tobacco companies attach to the illegal market in

Belarus can be seen in the fact that, despite having little official market share,[44] British American Tobacco and Philip Morris have the highest outdoor advertising budgets and the 9th and 10th highest television advertising budgets of all companies operating in that country.[45] In Belarus, as in Ukraine and Russia, tobacco is the product most heavily advertised outdoors and the fourth most advertised product on television (there are now restrictions on television advertising in Ukraine and Russia).[45,46] Thus, it appears that with the continuing (if so far fruitless) discussions of possible reunification with Russia, the transnational tobacco companies treat Belarus as an important extension of the Russian market.[47]

Kyrgyzstan differs from the other countries in which there have been transnational tobacco company investments in that these investments occurred later (in 1998) and one company, Reemtsma, achieved a manufacturing monopoly.[44] However, Kyrgyzstan also differs from Belarus, Kazakhstan, Ukraine, and Russia in regard to its lower levels of development and industrialization and its larger rural and Muslim populations. Other potential explanations for the between-country differences observed cannot be excluded here, and such possibilities are explored in a separate article.[48] Whatever reasons emerge, the rising rates of smoking among women and the younger ages of smoking initiation are cause for concern in all of these countries.

Meanwhile, the present findings, combined with earlier data on disease burden,[1,37] confirm that high smoking rates among men continue unabated. Smoking among women in Armenia, Georgia, Kyrgyzstan, and Moldova remains relatively uncommon and does not appear to have increased significantly, as can be seen in rates among the younger relative to older generations and in limited comparisons with previous data. By contrast, smoking rates among women in Belarus, Ukraine, Kazakhstan, and Russia showed an increase from previous surveys, and age-specific rates suggest an ongoing increase in tobacco use among members of the younger generations. It is probably not a coincidence that these higher rates were observed in the countries with the most active transnational tobacco company presence.

Conclusions

Concerted and urgent efforts to improve tobacco control must be made throughout the former Soviet Union to curtail current smoking and prevent further rises in smoking among women. Such efforts will require enactment and effective enforcement of comprehensive tobacco control policies, including a total ban on tobacco advertising and sponsorship, adequate taxation of both imported and domestic cigarettes, controls on smuggling, and restrictions on smoking in public places. The barriers to achieving these goals are considerable given the powerful influence of transnational tobacco companies and the limited development of democracy and civil society groups in much of the region.[21] The international community, cognizant of the role that international companies play in pushing the tobacco epidemic, should build on the work of the Open Society Institute (R. Bonnell, oral communication, September 2003) in strengthening the policy response to this threat. ■

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Contributors

A. Gilmore contributed to questionnaire design and data analysis and drafted the article. J. Pomerleau and M. McKee contributed to questionnaire design, data analysis, and revisions of the article. R. Rose contributed to questionnaire design and generation of hypotheses. C.W. Haerpfer, D. Rotman, and S. Tumanov designed and supervised the conduct of the surveys. M. McKee, C.W. Haerpfer, D. Rotman, and S. Tumanov originated and supervised the overall study.

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Human Participant Protection

This study was approved by the ethics committee of the London School of Hygiene and Tropical Medicine. Verbal informed consent was obtained from all study participants at the beginning of the interviews.

References

1. Peto R, Lopez AD, Boreham J, Thun M, Heath C. *Mortality From Smoking in Developed Countries 1950–2000.* Oxford, England: Oxford University Press Inc; 1994.

2. *Health for All Database.* Copenhagen, Denmark: World Health Organization, Regional Office for Europe; 2003.

3. Forey B, Hamling J, Lee P, Wald N. *International Smoking Statistics.* 2nd ed. Oxford, England: Oxford University Press Inc; 2002.

4. Grim CE, Grim CM, Petersen JR, et al. Prevalence of cardiovascular risk factors in the Republic of Georgia. *J Hum Hypertens.* 1999;13:243–247.

5. Grim CE, Grim CM, Kipshidze N, Kipshidze NN, Petersen J. CVD risk factors in Eastern Europe: a rapid survey of the capital of the Republic of Georgia [abstract]. *Am J Hypertens.* 1997;10:211A.

6. Corrao MA, Guindon GE, Sharma N, Shokoohi DF, eds. *Tobacco Control Country Profiles.* Atlanta, Ga: American Cancer Society; 2000.

7. Zaridze D, Dvoirin VV, Kobljakov VA, Pisklov VP. Smoking patterns in the USSR. In: Zaridze DG, Peto R, eds. *Tobacco: A Major International Health Hazard.* Lyon, France: International Agency for Research on Cancer; 1986. IARC Scientific Publication 74.

8. *Tobacco or Health: A Global Status Report.* Geneva, Switzerland: World Health Organization; 1997.

9. McKee M, Bobak M, Rose R, et al. Patterns of smoking in Russia. *Tob Control.* 1998;7:22–26.

10. Gilmore AB, McKee M, Telishevska M, Rose R. Smoking in Ukraine: epidemiology and determinants. *Prev Med.* 2001;33:453–461.

11. Gilmore AB, McKee M, Rose R. Smoking in Belarus: evidence from a household survey. *Eur J Epidemiol.* 2001;17:245–253.

12. Pudule I, Grinberga D, Kadziauskiene K, et al. Patterns of smoking in the Baltic Republics. *J Epidemiol Community Health.* 1999;53:277–282.

13. Raudsepp J, Rahu M. Smoking among schoolteachers in Estonia 1980. *Scand J Soc Med.* 1984;12:49–53.

14. *Confronting the Epidemic: A Global Agenda for Tobacco Control Research.* Geneva, Switzerland: World Health Organization; 1999.

15. Baris E, Waverley Brigden L, Prindiville J, Da Costa e Silva VL, Chitanondh H, Chandiwana S. Research priorities for tobacco control in developing countries: a regional approach to a global consultative process. *Tob Control.* 2000;9:217–223.

16. Lopez AD. Epidemiologic surveillance of the tobacco epidemic. *Morb Mortal Wkly Rep.* 1992; 41(suppl):157–166.

17. Connolly GN. Tobacco, trade and Eastern Europe. In: Slama K, ed. *Tobacco and Health.* London, England: Plenum Press; 1996:51–60.

18. Prokhorov AV. Getting on smokin' Route 66: tobacco promotion via Russian mass media. *Tob Control.* 1997;6:145–146.

19. Hurt RD. Smoking in Russia: what do Stalin and Western tobacco companies have in common? *Mayo Clin Proc.* 1995;70:1007–1011.

20. Krasovsky K. Abusive international marketing and promotion tactics by Philip Morris and RJR Nabisco in Ukraine. In: *Global Aggression: The Case for World Standards and Bold US Action Challenging Phillip Morris and RJR Nabisco.* New York, NY: Apex Press; 1998: 76–83.

21. Gilmore AB, McKee M. Tobacco and transition: an overview of industry investments, impact and influence in the former Soviet Union. *Tob Control.* 2004;13: 136–142.

22. Bettcher D, Subramaniam C, Guindon E, et al. *Confronting the Tobacco Epidemic in an Era of Trade Liberalisation.* Geneva, Switzerland: World Health Organization; 2001.

23. Chaloupka FJ, Laixuthai A. *US Trade Policy and Cigarette Smoking in Asia.* Cambridge, Mass: National Bureau of Economic Research; 1996. Working paper 5543.

24. EU-Copernikus Project Living Conditions: Lifestyle and Health. Vienna, Austria: Institute for Advanced Studies, 2003. Available at: http://www.llh.at. Accessed October 19, 2004.

25. Living Conditions, Lifestyles & Health Project Partners. Methods. Available at: http://www.llh.at/llh_partners_start.html. Accessed September 20, 2004.

26. Pomerleau J, McKee M, Rose R, Balabanova D, Gilmore A. *Living Conditions Lifestyles and Health: Comparative health report, June 2003.* London, England: London School of Hygiene and Tropical Medicine; 2003.

27. Centre for the Study of Public Policy, University of Strathclyde. New Europe Barometer Surveys. Available at: http://www.cspp.strath.ac.uk. Accessed September 20, 2004.

28. Heatherton TF, Kozlowski LT, Frecker RC, Fagerstrom KO. The Fagerstrom Test for Nicotine Dependence: a revision of the Fagerstrom Tolerance Questionnaire. *Br J Addict.* 1991;86:1119–1127.

29. Fagerstrom Test for Nicotine Dependence. Available at: http://www.fpnotebook.com/PSY81.htm. Accessed September 5, 2003.

30. Badurashvili I, McKee M, Tsuladze G, Meslé F, Vallin J, Shkolnikov V. Where there are no data: what has happened to life expectancy in Georgia since 1990? *Public Health Rep.* 2001;115:394–400.

31. Prattala R, Helasoja V, Finbalt Group. *Finbalt Health Monitor: Feasibility of a Collaborative System for Monitoring Health Behavior in Finland and the Baltic Countries.* Helsinki, Finland: National Public Health Institute; 1999.

32. Puska P, Helasoja V, Prattala R, Kasmel A, Klumbiene J. Health behaviour in Estonia, Finland and Lithuania 1994–1999. *Eur J Public Health.* 2003;13:11–17.

33. Patrick DL, Cheadle A, Thompson DC, Diehr P, Koepsell T, Kinne S. The validity of self-reported smoking: a review and meta-analysis. *Am J Public Health.* 1994;84:1086–1093.

34. Laatikainen T, Vartiainen E, Puska P. Comparing smoking and smoking cessation processes in the Republic of Karelia, Russia and North Karelia, Finland. *J Epidemiol Community Health.* 1999;53:528–534.

35. *World Tobacco File 1997—Cigars, Smoking Tobacco and Smokeless Tobacco.* London, England: DMG Business Media; 1999.

36. Shkolnikov V, McKee M, Leon D, Chenet L. Why is the death rate from lung cancer falling in the Russian Federation? *Eur J Epidemiol.* 1999;15:203–206.

37. Ezzati M, Lopez AD. Measuring the accumulated hazards of smoking: global and regional estimates for 2000. *Tob Control.* 2003;12:79–85.

38. Lopez AD, Collishaw NE, Piha T. A descriptive model of the cigarette epidemic in developed countries. *Tob Control.* 1994;3:242–247.

39. British American Tobacco Russia. History of tobacco in Russia. Available at: http://www.batrussia.ru/oneweb/sites/BAT_5FZF3V.nsf/vwPagesWebLive/DO5JVJYD?opendocument&SID=BAA08166A513AAEF3959A15BC3562EBC&DTC=20040920&TMP=1. Accessed September 20, 2004.

40. British American Tobacco Russia. BAT-Yava factory history. Available at: http://www.batrussia.ru/oneweb/sites/BAT_5FZF3V.nsf/vwPagesWebLive/DO5G2FWX?opendocument&SID=BAA08166A513AAEF3959A15BC3562EBC&DTC=20040920&TMP=1. Accessed September 20, 2004.

41. Dragounski D. Well—this is the Russian market. *World Tob Russia Eastern Eur.* 1998;2:32–46.

42. Alcohol and Drug Information Center. Economics of tobacco control in Ukraine from the public health perspective. Available at: http://www.adic.org.ua/adic/reports/econ. Accessed September 20, 2004.

43. Molarius A, Parsons RW, Dobson AJ, et al. Trends in cigarette smoking in 36 populations from the early 1980s to the mid-1990s: findings from the WHO MONICA Project. *Am J Public Health.* 2001;91: 206–212.

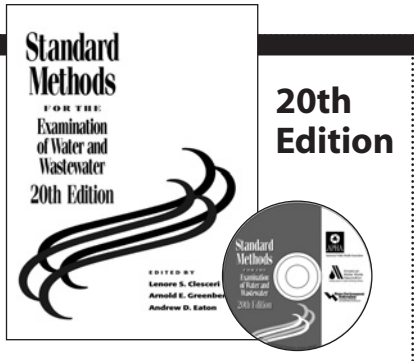
44. *World Cigarettes 2001.* Vol. 1. Newmarket, England: ERC Group; 2001.

45. *Central and Eastern Europe Market and Mediafact.* London, England: Zenith Optimedia; 2000.

46. World Health Organization Regional Office for Europe. Tobacco control database. Available at: http://data.euro.who.int/tobacco/. Accessed September 20, 2004.

47. A tactical market. *Tob J Int.* 2003;1:68. Also available at: http://www.tobacco.org/articles/country/Belarus. Accessed September 20, 2004.

48. Pomerleau J, Gilmore A, McKee M, Rose R, Haerpfer CW. Determinants of smoking in eight countries of the former Soviet Union: results from the Living Conditions, Lifestyles and Health Study. *Addiction.* In press.



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