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## ORIGINAL RESEARCH

### **Ethnic differences in smoking behaviour: The situation of Roma in Eastern Europe**

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## Abstract

**Aim:** To investigate ethnic differences in smoking between Roma and non-Roma and their determinants, including how discrimination faced by Roma may influence smoking decisions.

**Methods:** We analysed data from the Roma Regional Survey 2011 implemented in twelve countries of Central and South-East Europe with random samples of approximately 750 households in Roma settlements and 350 households in nearby non-Roma communities in each country. The overall sample comprises 11,373 individuals (8,234 Roma) with a proportion of women of 57% and an average age of 36 years. Statistical methods include marginal effects from Probit and zero-truncated negative binomial estimates to explain cigarette consumption.

**Results:** We found that Roma have a higher probability of smoking and are heavier smokers compared to otherwise comparable non-Roma. These differences in smoking behaviour cannot purely be explained by the lower socio-economic situation of Roma since the ethnic gap remains substantial once individual characteristics are controlled for. The probability of smoking is positively correlated with the degree of ethnic discrimination experienced by Roma, especially when it is related to private or public health services.

**Conclusions:** By providing evidence on smoking behaviour between Roma and non-Roma in a large number of countries, our findings support the need to understand smoking behaviour of Roma from a comparative perspective, and may ultimately contribute to more effective anti-smoking messages for Roma. However, if the health disadvantage faced by Roma is to be addressed adequately, this group must be involved more effectively in the policy and public health process.

**Keywords:** Central and South-East Europe, cigarette smoking, discrimination, ethnicity, Roma.

**Conflicts of interest:** None.

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## **Introduction**

While much is now known about the determinants of smoking, relating both to individuals (such as gender, age, marital status, and socio-economic characteristics), and product characteristics (such as price, availability, and marketing) (1-9), there has been less attention to ethnic differences in smoking behaviour, even though tobacco control measures may need to take account of factors, such as health beliefs, that might influence the effectiveness of certain policies and messages (10-12).

Roma are the largest ethnic minority group in Europe (estimated to number 10-12 million), most living in Central and South-East Europe (13). They suffer multiple disadvantages, with lower education, worse living conditions, and lower socio-economic status (14-17) and face discrimination in many areas of life, including barriers in accessing health services and health information (18-22). Consequently, Roma have worse health on many measures (15,17,19) than the majority populations in the same countries.

Research on the Roma population has largely focused on communicable diseases and child health (18), but more recent contributions have also investigated non-communicable diseases and health care (17,23). However, there have been fewer studies on health behaviours, although those that have been conducted show increased prevalence of risk factors, including smoking (24,25). Paulik and colleagues (23) report attitudes to tobacco control from a small cross-sectional survey, with only 83 Roma and 126 non-Roma, finding Roma respondents reluctant to accept restrictions on tobacco use. Petek and colleagues (26) conducted a small qualitative study of the meaning of smoking in Roma communities in Slovenia, but with only three women and nine men of Roma origin. They reported how smoking is seen as part of the cultural identity of Roma and is accepted by men, women and children, while invoking fatalism and inevitability to explain why smoking is not identified by Roma interviewed as a threat to health (26).

Given growing recognition of the role of smoking-related disease in perpetuating or accentuating health inequalities and lack of evidence on tobacco use among Roma, the aim of the present study is to investigate ethnic differences in smoking between Roma and non-Roma as well as their determinants, which includes how discrimination faced by Roma may influence smoking.

## **Methods**

### ***Data and samples***

We use data from the Roma Regional Survey, a cross-sectional household survey commissioned by the United Nations Development Programme, the World Bank and the European Commission. Further details on the survey methodology can be found at: <http://www.eurasia.undp.org/content/rbec/en/home/ourwork/sustainable-development/development-planning-and-inclusive-sustainable-growth/roma-in-central-and-southeast-europe/roma-data.html>

The sample comprises both Roma (N=9,207) and non-Roma (N=4,274) households living in countries with high proportion of Roma, namely Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Hungary, Macedonia, Moldova, Montenegro, Romania, Serbia and Slovakia.

The survey was conducted from May to July 2011. The intention was to include Roma living in distinct settlements and compare them with non-Roma living nearby. Given this intention,

it would have been inappropriate to compare what are known to be very deprived Roma settlements (27) with the general population, which would include many affluent groups who have little in common with those living in the settlements. Consequently, 350 non-Roma households living in the same neighbourhood – defined as households living in close proximity, within 300 meters, of a Roma settlement – were selected. A stratified cluster random sampling design was used. Thus, the first stage sampling frame comprised known Roma settlements, from which those to be included were sampled at random. Then non-Roma settlements nearby were selected, again at random. In the second sampling stage, households were randomly chosen with equal probability within each cluster for both populations.

The method of data collection was face-to-face interviews at the respondent's household. The overall sample comprised 13,481 households corresponding to 54,660 family members. Among them, 9,207 households were Roma (68.3%) and 4,274 were non-Roma (31.7%). We focus on the current smoking behaviour of respondents aged between 16 and 60 at the time of the survey. There is no information in the survey on past smoking decisions. This leaves us with a sample comprising 11,373 individuals, 8,234 of whom were Roma (72.4%).

The survey covers demographic characteristics, education, employment status, living standards, social values and norms, migration, discrimination, and health. Socio-economic status is proxied using a household asset index. This aggregate index is derived from a principal component analysis of a list of household possessions following the methodology described by Filmer et al. (28). The list of items included comprises radio receiver, colour TV, bicycle or motorbike, car/van for private use, horse, computer, internet connection, mobile phone or landline, washing machine, bed for each household member including infants, thirty and more books except school books, and power generator. The principal component technique was implemented on the entire sample, pooling Roma and non-Roma individuals. Higher values of the asset index correspond to higher long-run socioeconomic status.

The characteristics of respondents are summarised in Table 1.

**Table 1. Descriptive statistics of the sample (N=11,373)**

<b>Variables</b>	<b>(1) All respondents</b>	<b>(2) Roma Respondents</b>	<b>(3) Non-Roma respondents</b>	<b>(4)p-value of (2)-(3)</b>
Female	57,7%	57,8%	57,6%	0.848
Age in years	36,0	35,0	38,8	0.000
In a couple	69,5%	71,4%	64,5%	0.000
Divorced – separated	8,0%	7,9%	8,3%	0.473
Widowed	5,0%	5,2%	4,7%	0.330
Single	17,5%	15,6%	22,5%	0.000
Household size (number of persons)	4,3	4,7	3,5	0.000
No formal education	18,4%	24,8%	1,6%	0.000
Primary education	20,7%	26,4%	5,7%	0.000
Lower secondary education	34,2%	36,9%	27,1%	0.000
Upper/post-secondary education	26,7%	11,8%	65,7%	0.000
Paid activity – self-employed	31,7%	25,8%	47,2%	0.000
Homemaker – parental leave	19,7%	21,7%	14,2%	0.000
Retired	5,2%	4,1%	8,2%	0.000
Not working – other	43,4%	48,4%	30,4%	0.000
Asset index (value)	0,0	-0,6	1,5	0.000

Capital/district center	33,5%	33,0%	34,7%	0.103
Town	26,1%	26,2%	25,8%	0.665
Village/unregulated area	40,4%	40,8%	39,6%	0.238
Number of respondents	11,373	8,234	3,139	

Source: authors' calculations, UNDP/WB/EC Regional Roma Survey 2011.

About 58% are women and the average age is 36 years. On average, Roma are younger than non-Roma (35.0 versus 38.8). Roma have lower educational attainment and are more likely to be outside the formal labour market. Overall, scores on the asset index are worse for Roma (-0.563 compared to 1.477 for the non-Roma), although the scale of relative disadvantage varies, with the largest gaps in Croatia, Romania and Bulgaria.

For smoking behaviour, we used the two following questions. First, respondents indicated whether they smoked or not at the time of the survey: "with regard to smoking cigarettes, cigars, or a pipe, which of the following applies to you?". Possible answers were "I currently smoke - daily", "I currently smoke - occasionally", "I used to smoke but have stopped" and "I have never smoked". Second, those reporting one of the first two answers (either daily or occasionally) were asked: "on average, how many cigarettes, manufactured or hand-rolled do you smoke each day?". Note that it may be more difficult for occasional smokers to assess their daily consumption.

To examine the role of discrimination, we used the three following questions: i) "does your household have a doctor to approach when needed?"; ii) "do you feel safe in regards health protection – do you have the confidence that you will receive service in case you need it?"; and iii) "were there any instances in the past 12 months when your household could not afford purchasing medicines prescribed to, needed for a member of your household?". We also included in our regressions variables from a specific section about general discrimination and rights awareness. Discrimination is defined as being treated less favourably than others because of a specific personal feature such as age, gender or minority background. Self-assessed discrimination was assessed with the following question: "in the past 12 months (or since you have been in the country), have you personally felt discriminated against on the basis of one or more of the following grounds: a) because of ethnicity for non-Roma, because you are a Roma for Roma, b) because you are a woman/man, c) because of your age, d) because of your disability, e) for another reason".

Finally, we investigated the role played by access to health care system using answers to the following question: "during the last five years; have you ever been discriminated against by people working in public or private health services? That could be anyone, such as receptionist, nurse or doctor." The reason attributed to the discrimination was specified: it could be either a discrimination on the basis of ethnic background or a discrimination because of other reasons.

### **Statistical analysis**

We analysed the determinants of smoking behaviour both in terms of smokers versus non-smokers and number of cigarettes among smokers. To isolate as far as possible the role of ethnicity, we adjusted for the following individual characteristics, available for each household member: gender, age, marital status, household size, education level, asset index, occupation and location (capital or district centre, town, village or rural area).

We compared the pattern of smoking not only by ethnicity, but also by country to account for the potential role of country-specific factors such as tobacco price. As an initial comparison

showed that Roma were, as expected, materially worse off, we turned to an econometric analysis to explain both the decision to smoke and the consumption of cigarettes among smokers. We began with an investigation of the determinants of the probability of smoking using Probit regressions, with marginal effects for various specifications (Table 3). We also examined correlates of smoking intensity among smokers. Since the dependent variable had non-negative integer values, we used count data models and estimated a zero-truncated negative binomial regression to account for over-dispersion as in (29,30). Finally, we investigated the role of discrimination as a potential factor explaining the widespread smoking behaviour among the Roma population (Table 4).

## Results

### *Determinants of cigarette consumption*

A comparison of cigarette consumption by ethnicity and country in Table 2 shows that, while overall the proportion of smokers is 50.0%, there are substantial differences between countries. When pooling all countries, we found a much higher proportion of smokers among Roma than non-Roma (columns 2-4). The gap between these groups amounted to 15.5 percentage points. The prevalence differential was greatest in the Czech Republic (+31.4 points for Roma), followed by Hungary (+23.7 points), Slovakia (+22.7 points) and Bosnia and Herzegovina (+22.6 points). Conversely, there was no significant difference between Roma and non-Roma in Bulgaria, Macedonia and Montenegro. The situation was a little different in terms of intensity of smoking. There were significant differences in daily number of cigarettes (among smokers) between Roma and non-Roma in only four countries: Czech Republic (+3.8 cigarettes for Roma), Bosnia and Herzegovina (+3.1 cigarettes), Slovakia (+1.6 cigarettes) and Moldova (-5.1 cigarettes).

**Table 2. Cigarette consumption, by ethnicity and country**

Country	Proportion of current smokers (in %)				Cigarette consumption among smokers			
	(1) All	(2) Roma	(3) Non-Roma	(4)p-value of (2)-(3)	(5) All	(6) Roma	(7) Non-Roma	(8)=p-value of (6)-(7)
Albania	33.5	36.6	26.5	0.002	17.7	17.7	17.5	0.832
Bosnia and Herzegovina	54.6	61.1	38.5	0.000	21.2	21.8	18.7	0.009
Bulgaria	51.7	53.3	46.8	0.108	12.0	11.8	12.9	0.233
Croatia	57.3	64.1	38.4	0.000	16.1	16.2	15.5	0.766
Czech Republic	68.7	78.0	46.6	0.000	15.1	15.9	12.1	0.000
Hungary	55.2	61.3	37.6	0.000	15.5	15.4	16.1	0.469
Macedonia	42.1	43.2	39.3	0.279	17.2	17.4	16.6	0.443
Moldova	29.8	33.5	19.4	0.000	16.7	15.9	21.0	0.004
Montenegro	42.5	42.4	42.7	0.946	22.3	22.8	21.0	0.057
Romania	46.7	50.5	34.8	0.000	12.8	12.8	12.8	0.728
Serbia	58.9	61.7	51.5	0.004	18.4	18.3	18.7	0.627
Slovakia	57.4	64.2	41.5	0.000	14.2	14.5	12.9	0.005
All countries	50.0	54.2	38.7	0.000	16.5	16.7	16.2	0.139

Source: authors' calculations, UNDP/WB/EC Regional Roma Survey 2011.

We examined the role of individual characteristics in explaining differences in cigarette consumption between Roma and non-Roma. As shown in column 1A of Table 3, we found a positive correlation between the ethnic dummy and the smoking decision. At the sample means, the probability of smoking was 16.1 percentage points higher among Roma compared

to non-Roma. This marginal effect accounted for the role of country heterogeneity. The country dummies in the regression captured the influence of differences in tobacco prices as well as other unobserved differences in anti-smoking policies or tobacco advertising.

Next, we accounted for by individual characteristics, given the demographic and socio-economic differences in Roma and non-Roma respondents (column 2A). Our main result was that the Roma dummy was still positively correlated with the propensity to smoke at the one per cent level of significance. However, controlling for differences in respondents' characteristics strongly reduced the marginal effect of ethnic origin. Being Roma was now associated with an increase of 8.5 percentage points in the probability of smoking.

We also estimated separate regressions for each ethnic group (columns 3A and 4A). Many covariates such as gender, age, household size or education had a similar influence on the likelihood of smoking among Roma and non-Roma, but we noted some differences. For instance, the marginal effect associated with the asset index was three times higher for non-Roma compared to Roma. Similarly, having a paid activity and being homemaker were significantly correlated with probability of smoking (respectively positively and negatively) only for non-Roma. In column 1B, we found a positive correlation between Roma origin and cigarette consumption. In column 2B, the positive effect of Roma origin was still significant (at the five percent level) once individual characteristics were controlled for.

**Table 3. Probit and zero-truncated negative binomial estimates of cigarette consumption – marginal effects**

Variables	Probability of smoking				Cigarette consumption among smokers			
	(1A) All	(2A) All	(3A) Roma	(4A) Non-Roma	(1B) All	(2B) All	(3B) Roma	(4B) Non-Roma
Roma	0.161** (15.15)	0.085** (5.91)			0.734* (2.39)	0.927* (2.49)		
Female		-0.138** (-12.69)	-0.125** (-9.60)	-0.166** (-8.64)		-2.784** (-9.82)	-2.892** (-8.76)	-2.034** (-3.65)
Age (ref: ≤20)	21-30	0.090** (4.85)	0.067** (3.26)	0.143** (3.35)		2.374** (4.33)	2.123** (3.59)	3.587* (2.37)
	31-40	0.123** (6.28)	0.105** (4.86)	0.128** (2.81)		3.214** (5.53)	2.800** (4.48)	4.896** (3.01)
	41-50	0.157** (7.61)	0.158** (6.87)	0.129** (2.75)		4.168** (6.44)	3.993** (5.65)	5.090** (2.98)
	51-60	0.119** (5.32)	0.117** (4.63)	0.090 (1.85)		4.103** (5.83)	3.485** (4.54)	6.028** (3.29)
Marital status (ref: In a couple)	Divorced – separated	0.035 (1.87)	0.042 (1.93)	0.031 (0.92)		0.508 (1.07)	0.577 (1.06)	0.392 (0.41)
	Widowed	0.032 (1.32)	0.035 (1.26)	0.004 (0.09)		-0.050 (-0.08)	-0.204 (-0.30)	1.153 (0.77)
	Single	-0.031* (-2.00)	-0.041* (-2.19)	-0.057* (-2.08)		-0.185 (-0.47)	-0.724 (-1.59)	1.205 (1.48)
Household size		0.007** (2.81)	0.006* (2.09)	0.015* (2.30)		0.085 (1.36)	0.107 (1.60)	-0.017 (-0.09)
Education Primary (ref: no formal)		0.002 (0.15)	-0.001 (-0.08)	-0.110 (-1.48)		-0.958* (-2.48)	-1.040** (-2.60)	-0.273 (-0.13)
	Lower secondary	-0.008 (-0.55)	-0.028 (-1.68)	-0.102 (-1.44)		-1.071** (-2.77)	-1.337** (-3.25)	-0.688 (-0.38)
	Upper/post-secondary	-0.061** (-3.17)	-0.090** (-3.95)	-0.138 (-1.89)		-1.459** (-3.08)	-1.595** (-3.04)	-0.593 (-0.31)
Activity (ref: not working – other)	Paid activity – self-employed	0.023 (1.81)	0.021 (1.43)	0.039 (1.66)		0.188 (0.60)	0.262 (0.72)	0.397 (0.62)
	Homemaker – parental leave	-0.019 (-1.35)	-0.013 (-0.83)	-0.065* (-2.11)		-0.511 (-1.37)	-0.615 (-1.52)	0.256 (0.26)
	Retired	-0.089** (-3.58)	-0.071* (-2.22)	-0.098* (-2.56)		-1.098 (-1.73)	-0.925 (-1.21)	-1.331 (-1.16)
Asset index		-0.026**	-0.016**	-0.048**		0.189*	0.266**	-0.101



			(-7.62)	(-4.00)	(-7.58)		(2.15)	(2.63)	(-0.56)
Location	Town		-0.040**	-0.050**	0.001		-1.445**	-1.570**	-1.112
(ref: Capital/district center)			(-2.96)	(-3.14)	(0.03)		(-4.38)	(-4.19)	(-1.61)
	Village/unregulated area		-0.049**	-0.039**	-0.059*		-2.186**	-2.360**	-1.437*
			(-3.81)	(-2.63)	(-2.50)		(-6.87)	(-6.53)	(-2.15)
Country dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES
Number of respondents	11,373	11,373	8,234	3,139	5,682	5,682	4,466	1,216	

Source: authors' calculations, UNDP/WB/EC Regional Roma Survey 2011.

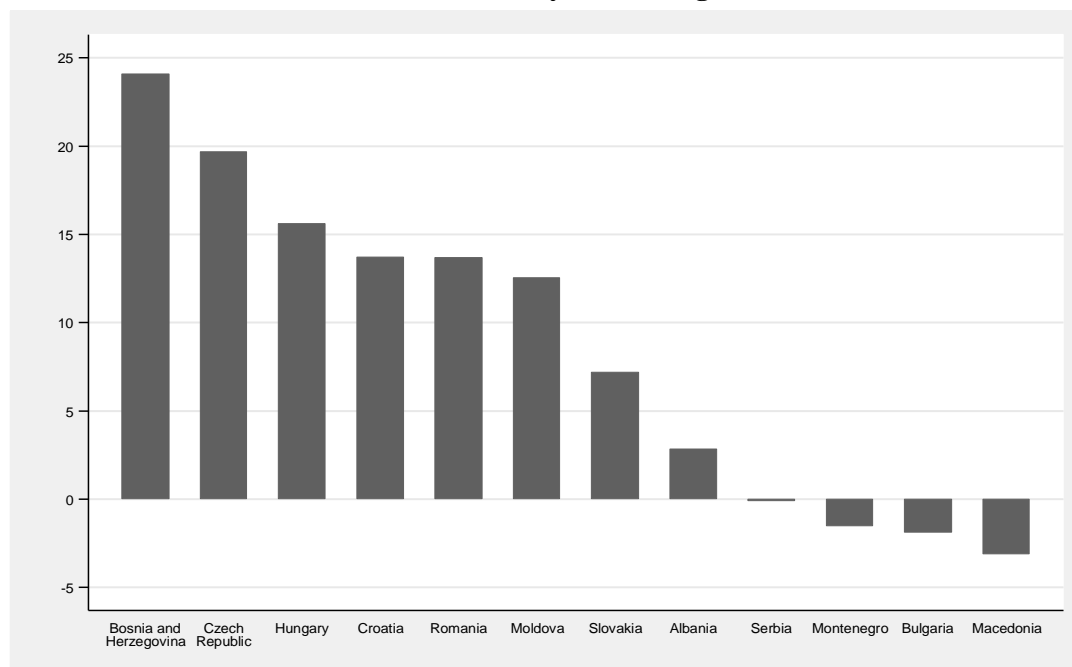
Note: the probability of smoking is explained using a Probit model, the cigarette consumption among smokers is explained using a zero-truncated negative binomial model. Significance levels are  $p < 0.01$  (\*\*) and  $p < 0.05$  (\*).

When comparing the estimates obtained separately on the Roma and non-Roma samples (columns 3B and 4B), the correlation between consumption of cigarettes and gender, age as well as location had the same sign for both ethnic groups. Conversely, we observed some differences in the role of education and asset index among smokers. First, the negative correlation between education and cigarettes was only significant for Roma. Second, we found a positive correlation between consumption of cigarettes and the asset index only for Roma. As Roma are economically disadvantaged, only those with adequate resources will be able to purchase and smoke cigarettes.

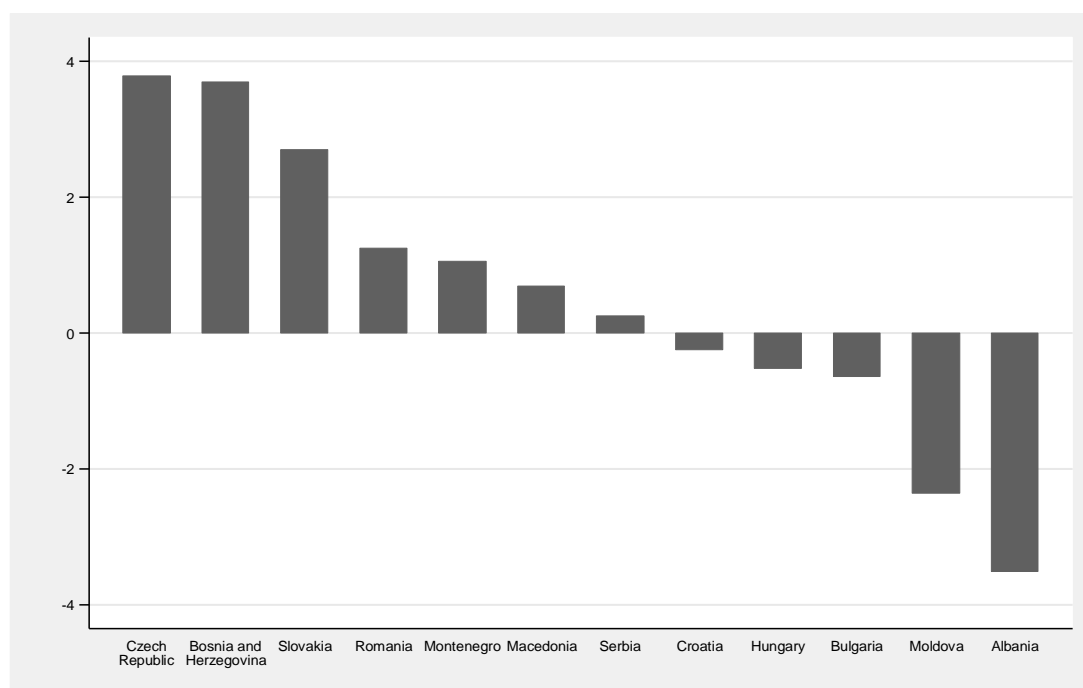
Finally, we estimated country-specific regressions. For ease of interpretation, we presented the marginal effect associated with the Roma dummy (Figure 1).

**Figure 1. The gap in smoking between Roma and non-Roma, by country**

**A. Probability of smoking**



**B. Cigarette consumption among smokers**



Source: authors' calculations, UNDP/WB/EC Regional Roma Survey 2011.

The probability of smoking was 24.1 percentage points higher among Roma than non-Roma in Bosnia and Herzegovina. The gap was significant in seven other countries: by decreasing order of magnitude, the Czech Republic (19.7 percentage points), Hungary (15.6), Croatia (13.7), Romania (13.7), Moldova (12.5), Slovakia (7.1) and Albania (2.8). Roma consumed 3.8 additional cigarettes per day in the Czech Republic compared to non-Roma smokers. The situation was very similar in Bosnia and Herzegovina (+3.7 cigarettes), Slovakia (2.7), Romania (1.3) and Montenegro (1.1).

### Smoking and discrimination

The proportion of respondents who felt discriminated against because of ethnicity was much higher among Roma (34.6%) than non-Roma (4.9%) (+29.7 percentage points). The ethnic differential was lower but still significant when considering other forms of discrimination: +6.9 points because of gender (8.3% for Roma compared to 3.1% for non-Roma), +1.9 points because of age (6.2% against 4.3%) and +1.8 points because of disability (3.6% against 1.8%). When pooling the various reasons, the ethnic gap amounted to 26 percentage points (36.7% against 16.7%).

We added indicators of health inequalities to our previous regressions explaining smoking decisions (panel A of Table 4).

**Table 4. Discrimination and cigarette consumption – marginal effects from Probit and zero-truncated negative binomial models**

Variables	Probability of smoking			Cigarette consumption among smokers				
	(1A) All	(2A) All	(3A) Roma	(4A) Non-Roma	(1B) All	(2B) All	(3B) Roma	(4B) Non-Roma
Panel A: Roma	0.085** (5.91)	0.081** (5.63)			0.927* (2.49)	0.920* (2.47)		

Doctor to approach when needed		0.037*	0.033	0.050		0.211	0.336	-0.826
		(2.23)	(1.82)	(1.31)		(0.50)	(0.74)	(-0.69)
Feel safe in regards health protection		-0.015	-0.015	-0.012		-0.219	-0.155	-0.401
		(-1.11)	(-0.95)	(-0.44)		(-0.63)	(-0.41)	(-0.49)
Cannot afford purchasing medicine prescribed		0.032**	0.028*	0.033		0.027	0.012	0.258
		(2.92)	(2.34)	(1.46)		(0.10)	(0.04)	(0.40)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES
Number of respondents	11,373	11,373	8,234	3,139	5,682	5,682	4,466	1,216
<b>Panel B:</b>								
Roma		0.085**	0.077**		0.927*	0.828*		
		(5.91)	(5.27)		(2.49)	(2.19)		
Discriminated against in the past 12 months			0.041**	0.045		0.482	0.450	0.269
			(3.62)	(2.80)		(1.67)	(1.46)	(0.32)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES
Number of respondents	11,373	11,373	8,234	3,139	5,682	5,682	4,466	1,216
<b>Panel C:</b>								
Roma		0.085**	0.072**		0.927*	0.825*		
		(5.91)	(4.93)		(2.49)	(2.17)		
Discriminated against in the past 12 months because of ethnicity			0.059**	0.060**	-0.001	0.399	0.187	1.582
			(4.62)	(4.40)	(-0.02)	(1.26)	(0.56)	(1.23)
Discriminated against in the past 12 months because of other reasons			-0.038*	-0.058**	0.043	0.172	0.482	-1.376
			(-2.30)	(-3.10)	(1.21)	(0.41)	(1.03)	(-1.50)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES
Number of respondents	11,373	11,373	8,234	3,139	5,682	5,682	4,466	1,216
<b>Panel D:</b>								
Roma		0.085**	0.079**		0.927*	0.891*		
		(5.91)	(5.46)		(2.49)	(2.38)		
Discriminated against by people working in health servicesbecause of ethnicity			0.078**	0.072**	0.057	0.467	0.238	3.901
			(4.29)	(3.84)	(0.79)	(1.06)	(0.53)	(1.54)
Discriminated against by people working in health servicesbecause of other reasons			-0.053	-0.060	-0.035	-0.409	0.146	-4.160*
			(-1.79)	(-1.84)	(-0.49)	(-0.55)	(0.18)	(-2.41)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES
Number of respondents	11,373	11,373	8,234	3,139	5,682	5,682	4,466	1,216

Source: authors' calculations, UNDP/WB/EC Regional Roma Survey 2011.

Note: the probability of smoking is explained using a Probit model, the cigarette consumption among smokers is explained using a zero-truncated negative binomial model. Significance levels are  $p < 0.01$  (\*\*) and  $p < 0.05$  (\*).

We found that people who could approach a doctor when needed has a higher probability of smoking (column 2A). This result is seemingly counterintuitive but it may be that those living in areas with access to a doctor have higher (unobserved) levels of income or can more easily buy cigarettes. However, there may also be reverse causation as smokers are likely to have more health problems and thus more frequent interactions with doctors. While feeling safe had no influence on smoking, the correlation between probability of smoking and inability to purchase medicines prescribed was positive for Roma respondents only (column 3A). None of our indicators of health inequalities had an influence on intensity of cigarette consumption among smokers.

In Panel B of Table 4, we found a positive correlation between smoking behaviour and feeling of discrimination (whatever its reason). The probability of smoking increased by 4.1 percentage points for those who felt discriminated against (column 2A). The role played by discrimination was mainly observed in terms of probability rather than intensity of smoking. The correlation between discrimination and cigarette consumption among smokers was not significant when separating Roma and non-Roma (columns 2C and 2D). As shown in Panel C, most of the effect came from discrimination on the basis of ethnic background. Indeed, the coefficient associated with ethnic discrimination was positive and significant, but it was negative for other forms of discrimination.

As a final step, we explored the correlation between smoking and discrimination in access to the health care system (Panel D). The probability of smoking is higher among respondents

who felt discriminated against by people working in health services on ethnic grounds (+7.8 points). Conversely, the correlation is negative for the other forms of discrimination (-5.3 points) while there was no significant relationship with smoking intensity.

## **Discussion**

In this paper we compared the smoking behaviour of Roma and those in the majority population living nearby in twelve countries of Central and South-East Europe. The strengths of this study lie in the use of a large study sample across multiple countries. Previous research on Roma health tends to be restricted to a small number of countries, mainly Hungary, the Czech Republic and Slovakia (15,16,23,26), and which often use small sample sizes which make comparisons between Roma and non-Roma groups of population difficult.

This study is, however, subject to a number of limitations. First, by design, it does not provide a representative sample of the Roma population in the countries concerned. This is an inevitable and well-known problem facing all research on Roma health, reflecting problems of defining the Roma population (31). There are varying degrees of assimilation in each country and estimates of the Roma population vary, reflecting in part the reason why a particular survey was undertaken and thus the incentive to self-identify as Roma. Furthermore, in some situations there may be strong disincentives to do so, given the previous experience of this population in their dealings with authority. For this reason, much of the existing research has adopted the approach used here, focussing on the most marginalised Roma groups, and the most easily and consistently identifiable.

Second, the sample size in each country is relatively small, limiting the power to compare sub-groups.

Third, there is a need for qualitative research to understand better the place that smoking occupies within Roma communities and the barriers that exist to reducing smoking rates. Qualitative research has found that smoking is important in cultural and ethnic identity of Roma, with smoking being introduced by older family members to younger ones. Even where there is awareness of health risks associated with smoking, there is little willingness to consider quitting, to reduce exposure to second-hand smoke, or to prohibit children from smoking because it is considered part of growing up (23). Policies that attempt to limit tobacco access to children or eliminate smoking in public places are rejected (26).

Fourth, some factors that might influence smoking behaviour are missing from the Roma Regional survey. For instance, we could not include household income in our regressions, although we were able to use an asset index, which captures household wealth.

Fifth, interpretation of findings on discrimination is complex. From an individual perspective, the perception of discrimination is a sensitive topic. Feeling discriminated against is subjective and may be subject to justification bias. This would occur if Roma respondents report being discriminated in order to justify their smoking decision. At the same time, according to the EU-MIDIS report on discrimination argues, discrimination against Roma seems to be largely unreported (32).

Finally, a limitation, inherent in the cross-sectional design, is that we are unable to show a causal association between discrimination and smoking. It may be that Roma decide to smoke because they feel less accepted by the rest of the population, but their higher smoking prevalence may also be perceived as a potential signal of their ethnicity, as noted above.

Our findings show that Roma respondents are more likely to smoke and are heavier smokers on average compared to non-Roma (with substantial heterogeneity in the gap between the

two groups between countries). A recent study found no genetic basis for differences in smoking among Roma and non-Roma in Hungary (33). Now, this study shows that differences in smoking behaviour cannot simply be explained by the worse socio-economic situation of Roma. First, the non-Roma comparison population comprises those living in close proximity to Roma settlements and not the general population. Thus, our data will presumably underestimate the overall gap between the Roma and non-Roma population in each country. Second, the ethnic gap remains substantial once individual characteristics are controlled for, although of course it is possible that our indicators do not fully capture relative disadvantage. Importantly, this conclusion is consistent with another study using a different data set but similar methodology in Hungary (34).

We also find some positive correlation between the probability of smoking and discrimination reported by Roma, especially with respect to private or public health services, but not in terms of smoking intensity. Our findings support other literature on the disadvantage and discrimination faced by Roma in Central and South-East Europe (13,15,21,22,35,36) with Roma considered by some as the most discriminated against group in Europe (32). This reinforces the importance of developing messages through a shared process, involving Roma participation, and in ways that avoid stigmatisation, as part of comprehensive policies to tackle disadvantage and discrimination (37).

### **Conclusions**

To the best of our knowledge, this study is the first to provide comparative evidence on smoking behaviour between Roma and non-Roma in a large number of countries. Our findings support the need to understand smoking behaviour of Roma from a comparative perspective, and may ultimately contribute to improved anti-smoking policies towards Roma. If Roma health vulnerability is to be addressed adequately, efforts need to be concentrated on involving Roma in the policy and public health process, including measures that specifically address the factors that lead to high rates of smoking in this multiply disadvantaged population.

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