Prevalence, perceptions and factors associated with menthol cigarette smoking: findings from the ITC Kenya and Zambia Surveys

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ABSTRACT

Background Menthol masks the harshness of cigarette smoke, promotes youth smoking and encourages health-concerned smokers who incorrectly believe that menthols are less harmful to smoke menthols. This study of smokers in Kenya and Zambia is the first study in Africa to examine menthol use, smokers' beliefs about its harmfulness and the factors associated with menthols.

Methods Data were from the International Tobacco Control (ITC) Kenya Wave 2 (2018) and Zambia Wave 2 Survey (2014), involving nationally representative samples of smokers. This study focuses on 1246 adult smokers (644 in Kenya, 602 in Zambia) who reported smoking a usual brand of cigarettes (menthol or non-menthol).

Results Overall, menthol use was significantly higher among smokers in Zambia than in Kenya (48.0% vs 19.0%), females (45.6% vs 31.2% males), non-daily smokers (43.8% vs 30.0% daily) and those who exclusively smoked factory-made (FM) cigarettes (43.0% vs 15.2%). The erroneous belief that menthols are less harmful was more likely among smokers in Zambia than in Kenya (53.4% vs 29.3%) and among female smokers (38.5% vs 28.2%). In Kenya, menthol smoking was associated with being female (adjusted odds ratios (AOR)=3.07; p=0.03), worrying about future health (AOR=2.28; p=0.02) and disagreeing with the statement that smoking was calming (AOR=2.05; p=0.04). In Zambia, menthol use was associated with being female (AOR=3.91; p=0.002), completing primary school (AOR=2.14; p=0.03), being a non-daily smoker (AOR=2.29; p=0.03), exclusively using FM cigarettes (AOR=14.7; p<0.001), having a past quit attempt (AOR=1.54; p=0.02), believing that menthols are less harmful (AOR=3.80; p<0.001) and choosing menthols because they believed it was less harmful (AOR=3.52; p<0.001).

Conclusions Menthols are highly prevalent among females in both countries. There is a need in African countries to combat the myth that menthols are less harmful and to ban menthol and other flavourings.

INTRODUCTION

Menthol is a chemical product of mint and has a cooling, soothing and pain-relieving effect.[1] When present in cigarettes, menthol masks the harshness of smoke, making it easier for youth to start and maintain smoking, and encouraging health-concerned smokers to switch to menthols, incorrectly believing that menthol cigarettes are less harmful, which is not the case.[2–4] Smoking menthol cigarettes is associated with an increased risk of preventable disease, disability and death[5] providing the foundation for banning menthol.

A study by Villanti *et al*[4] found that 84.6% of all African-American smokers use menthol cigarettes compared with 28.9% of all white smokers, 38.0% of Asian smokers and 46.9% of Hispanic smokers. Another US study found that menthol and tobacco product marketing was high in areas with the highest percentages of black residents.[6] Research from high-income countries (HICs) has demonstrated that menthol use is associated with: youth smoking initiation (USA),[4 7–12] being female,[13] being younger,[13] lower education,[13 14] the misperception that menthol cigarettes are less harmful than regular cigarettes,[15–18] the belief that menthol cigarettes are more medicinal than regular cigarettes,[17] failed quit attempts,[19–22] being less likely to have a previous quit attempt longer than 90 days,[23] nicotine dependence,[4 23] depression and anxiety.[24]

As of October 2021, only 35 countries had fully implemented bans on the sale of menthol cigarettes, that is, European Union (27 countries), Canada, Moldova, Turkey, UK, Ethiopia, Nigeria, Senegal and Uganda.[25] However, in recent years, the tobacco industry has increased marketing of cigarettes with squeezable flavour capsules[26] and flavour cards[27] (includes fruit and menthol flavours) to circumvent the menthol ban regulations.[26] Evidence from an evaluation of Canada's menthol ban showed that the ban increased quit attempts among menthol smokers (in comparison with non-menthol smokers) and led to successful quitting among daily menthol users.[28] In April 2021, the Food and Drug Administration announced[29] that they are preparing to ban menthol cigarettes in the USA within the year, citing evidence that Canada's 2015–2017 menthol cigarette ban led to significant increases in quitting[28] and a modelling study projecting that a menthol cigarette ban in the USA would avert 633 000 deaths, of which 237 000 of the averted deaths would be among African-Americans.[30]

Nearly all studies that have examined the factors that are associated with menthol use are from HICs and upper middle-income countries. In contrast, much less is known about menthol cigarettes from lower middle-income and low-income countries, especially from Africa, where 6% of the world's adult smokers (about 77 million) reside,[31] but

where smoking prevalence is expected to rise more rapidly than the other regions.[32] One study from Zambia,[33] which focused on brand loyalty and price, found that menthol cigarettes were targeted at low-income earners. Of the three brands (Pall Mall, Peter Stuyvesant and Sweet Menthol) that dominate the cigarette market in Zambia, the price of Sweet Menthol cigarettes is about half of the other two brands.

Kenya and Zambia ratified the Framework Convention on Tobacco Control (FCTC) on June 2004 and August 2008, respectively,[34 35] but do not have a ban on menthol cigarettes. To our knowledge, this study, conducted among nationally representative samples of adult smokers in Kenya and Zambia, is the first in Africa to compare menthol use, smokers' beliefs about the relative harmfulness of menthol cigarettes and the factors associated with menthol smoking.

METHODS
Study design and participants
The ITC Kenya and Zambia Surveys are part of the larger International Tobacco Control Policy Evaluation Project (the ITC Project),[36 37] which consists of parallel longitudinal cohort surveys of tobacco users in 31 countries. For this study, we used the most recent wave in Kenya (Wave 2) and Zambia (Wave 2), and there were no longitudinal analyses. The ITC Kenya and Zambia Surveys were designed to include nationally representative samples of tobacco users and non-users aged 15 years and older who were selected using a multistage clustered sampling design. At Wave 1, the design was stratified by province and sampled a total of 148 (Kenya) and 150 (for Zambia) enumeration areas, allocated to the provinces in numbers proportional to population size. Within each EA, 10 tobacco users and 4 non-users of tobacco were selected and interviewed. At Wave 2, every effort was made to recontact Wave 1 households and individual respondents from these households. Those individuals lost to attrition were replaced by new respondents from newly enumerated households within the same EA where possible (if not possible, additional new households were selected randomly from a newly sampled EA). Eligible members of the household were selected using the same procedure as in Wave 1. A detailed description of the sampling and study design is available in the ITC Kenya and Zambia Wave 2 Technical Reports.[38 39]

The respondents for this study were adult current smokers aged 18 years and older who reported in the ITC survey that they had a usual cigarette brand. They were also asked questions about brand name, which allowed us to determine whether each smoker's usual brand was a menthol or non-menthol brand. Also included in the extensive ITC survey were questions asking about beliefs about menthols.

Smokers were defined as those who had smoked at least 100 cigarettes in their lifetime and smoked at least once in the past 30 days. The sample sizes for smokers were as follows: Kenya: n=644 and Zambia: n=602. The Wave 2 data from Zambia were collected from August to October 2014 and in Kenya from April to June 2018. In Kenya, the questionnaires were administered in Kiswahili (national language) or English (official language) for those respondents who preferred English. In Zambia, questionnaires were administered in English and five main local languages: Bemba, Nyanja, Kaonde, Tonga and Lozi. Translations were reviewed by research team members who are bilingual or multilingual. All issues that were identified were discussed and resolved to ensure that the translations met the research team's standards for the highest possible degree of clarity and accuracy and have the closest equivalence to the English survey

content—this is a method that is superior to traditional double translation methods.[40]

Measures
Outcome variables
Menthol use was based on responses to the question: 'What is the name of your usual cigarette brand' (responses were recoded into two categories (1=menthol and 2=others)). Perception of the harmfulness of menthol cigarette was assessed by asking respondents to rate their degree of agreement with the statement: 'Menthol cigarettes are less harmful than regular cigarettes' (recoded into two categories, i.e, 'agree/strongly agree' and 'disagree/strongly disagree/neutral').

Predictor variables
Sociodemographic variables were gender (male or female), age at the time of the survey (18–24, 25–39, 40–54, 55+ years) and income (a measure of the respondent's combined average household income for 1 year), which was recoded into three categories (low, medium and high). Education is defined as a respondent's highest level of education achieved, recoded into three categories, that is, low (no education or did not complete primary education), moderate (completed primary education) and high (secondary education or higher). We assessed several variables regarding the type of tobacco they smoked recoded into two categories (factory-made (FM) cigarettes only, roll-your-own (RYO)/both FM and RYO).

Reasons/motivations for choosing menthol cigarettes brand was assessed by asking respondents 'In choosing this brand of cigarettes, was part of your decision based on any of the following?': (1) 'The taste (Yes, No)' and (2) 'The brand is less harmful to my health (Yes, No)'.

Past year quit attempts were assessed (yes, no/not stated). Quit intention was based on responses to the question: 'Do you plan to quit smoking?'. Respondents who selected 'in the next month', 'in the next 6 months' or 'sometime in the future after 6 months' were defined as having an intention to quit = 1 (yes), and those who responded 'not at all' or did not state their response were defined as having no intention to quit = 0 (no/not stated).

A question examining motivation to smoke was measured by asking for rating of agreement with the statement: 'Smoking calms you down when you are stressed or upset'. This variable was recoded into three categories, that is, 'agree/strongly agree', 'disagree/ strongly disagree' and 'not stated.' Smokers' risk perceptions of smoking was assessed by asking: 'How worried are you that smoking cigarettes will damage your health in the future?'. This was recoded as 'moderately/very worried' and 'not at all/a little worried/not stated'.

Statistical analyses
Data from the Zambia and Kenya surveys were pooled together into one dataset. The percentage of smokers whose regular brand was menthol, and perceptions of the harmfulness of menthols were calculated for each country using Generalised Estimating Equations, fitted with SAS callable SUDAAN (V.11). The analyses were weighted, allowing for generalisations to the national population of adult smokers aged 18 years and older in each country. Multivariable survey logistic regression models were conducted by incorporating complex survey sample designs, including stratification, clustering and unequal weighting. The factors potentially associated with menthol use were assessed first in bivariate models (controlling for country, gender, age, income, education, smoking status (daily and non-daily) and

Table 1 Characteristics of the Kenyan and Zambian smokers (weighted)

Variable	Overall (%) n=1246	Kenya (%) n=644	Zambia (%) n=602	P value (Kenya vs Zambia)
Gender (% males)	94.9	93.6	96.4	0.03
Age group (years)				
18–24	7.8	4.0	11.8	<0.0001
25–39	40.0	38.2	41.9	
40–54	31.4	33.9	28.9	
≥55	20.8	23.9	17.4	
Monthly household income				
Low	48.5	54.2	42.4	0.0005
Medium	15.7	18.8	12.5	
High	25.8	14.6	37.8	
Not Stated	10.0	12.4	7.3	
Level of education				
Low (illiterate/not completed primary school)	6.6	4.5	8.9	0.06
Moderate (completed primary school)	48.6	49.6	47.5	
High (secondary school or higher)	44.8	45.9	43.6	
Smoking status				
Daily	89.6	91.9	87.0	0.005
Non-daily	10.4	8.1	13.0	
Type of cigarette				
Roll-your-own cigarettes: only or with factory-made cigarettes	30.6	15.1	47.2	<0.0001
Factory-made cigarettes only	69.4	84.9	52.8	
Menthol use				
Yes		19.0	48.0	<0.0001

Table 2 Menthol cigarette use by country (weighted)

	Overall (%)	Kenya (%)	Zambia (%)
Gender			
Male	31.2*	18.3	47.2†*
Female	45.6	29.1	64.8†
Age group (years)			
18–24	33.8*	6.8*	66.2†*
25–39	32.7	20.8*	47.6†
40–54	30.4	19.1*	44.6†*
≥55	20.9	13.3	31.0*
Household income			
Low	30.9	16.9	48.3†
Medium	34.5	23.9	47.6†
High	27.6	12.9	45.9†
Not reported	37.8	30.5	46.8
Level of education			
Low (illiterate/not completed primary school)	23.4	16.4	32.2*
Moderate (completed primary school)	34.0	20.7	50.4†*
High (secondary school or higher)	30.8	17.6	47.1†
Smoking status			
Non-daily	43.8*	21.9	68.7†*
Daily	30.0	18.0	44.9†
Type of cigarette			
Roll-your-own cigarettes: only or with factory-made cigarettes	15.2*	15.9	14.4*
Factory-made cigarettes only	43.0	21.8	64.8†

*Significant at p<0.05 (within each category/country).
†Significant at p<0.05 (between Kenya and Zambia).

time in sample, with each of the independent variables of interest for potential explanatory variables. Those that were significant were included in a full multivariable model where the association between each independent variable, and the dependent variable was adjusted for all other variables in the models. Interactions were also assessed to show different effects between the two countries. Analyses were conducted with pooled data and also separately for each country.

RESULTS
Characteristics of the sample
Table 1 shows the characteristics of the smoker samples from Kenya and Zambia. The majority of smokers were male (94.9%), daily smokers (89.6%) and use FM cigarettes (69.4%). Their mean age was 41.7 years (SD 14.8). The two countries differed significantly (p<0.05) regarding demographic characteristics except in education. Menthol use was significantly higher in Zambia compared with Kenya (48.0% vs 19.0%; p<0.0001).

Menthol use and perceptions of harm
Table 2 shows menthol use by sociodemographic factors. Overall, menthol use was significantly higher among females (45.6% vs 31.2%; p=0.01), younger Zambian (vs Kenyan) smokers aged 18–24 years (66.2% vs 6.8%; p<0.0001), Zambian non-daily (vs daily) smokers (68.7% vs 44.9%; p<0.0001) and Zambian

smokers who exclusively smoked FM (vs RYO/both users) cigarette (64.8% vs 14.4%; p<0.0001) (table 2).

Online supplemental table S1 shows the prevalence of potential predictors of menthol use among Kenya and Zambia menthol smokers. Menthol smokers from Zambia were significantly more likely to have past quit attempts (55.4% vs 24.3%; p=0.0002) and quit intentions (74.9% vs 45.2%; p=0.0001) than Kenyan menthol smokers. The misperception that menthol cigarettes are less harmful than regular (non-menthol) cigarettes was more prevalent among menthol smokers from Zambian than Kenyan (53.4% vs 29.3%; p=0.0037). The prevalence of other predictors namely worrying that smoking will damage their health or reasons for choosing the brand were not significantly different between the two countries.

This misperception was also more likely to be held among female smokers (38.5% vs 28.2%; p=0.05) and menthol users (40.9% vs 24.6%; p=0.002) from both countries (table not shown).

Factors associated with menthol cigarette use
Table 3 presents the multivariable predictor model. In Kenya, the odds of females smoking menthol cigarettes were three times greater (AOR 3.07; p=0.03) than the odds of males smoking menthol cigarettes. Menthol smoking in Kenya was also associated with: (1) being worried that smoking will damage their health in the future (AOR 2.28; p<=0.02) and (2) disagreeing with the statement that smoking calmed them down (AOR 2.05; p=0.04).

In Zambia, there were more factors associated with menthol cigarette smoking. The odds of females smoking menthol cigarettes were nearly four times greater (AOR 3.91; p=0.002) than the odds

Table 3 Multivariable logistic regression: factors associated with menthol use by country

	Multivariable analysis AOR (95% CI)	
	Kenya	**Zambia**
Gender		
Male	1	1
Female	**3.07 (1.12 to 8.46)**	**3.91 (1.69 to 9.03)**
Level of education		
Low (illiterate/ not completed primary school)	1	1
Moderate (completed primary school)	1.98 (0.24 to 16.16)	**2.14 (1.10 to 4.17)**
High (secondary school or higher)	2.12 (0.25 to 17.65)	1.92 (0.99 to 3.71)
Smoking status		
Non-daily	1.68 (0.71 to 3.97)	**2.29 (1.06 to 4.93)**
Daily	1	1
Type of cigarette		
Roll-your-own: only or with FM	1	1
Factory made (FM) only	1.46 (0.40 to 5.30)	**14.71 (5.87 to 36.89)**
Past quit attempt		
No/not stated	1	1
Yes	0.67 (0.36 to 1.26)	**1.54 (1.04 to 2.27)**
Perception that menthol is less harmful		
Disagree/strongly disagree	1	1
Agree/strongly agree	1.76 (0.95 to 3.25)	**3.80 (1.82 to 7.93)**
Not stated	1.70 (0.73 to 3.95)	1.30 (0.59 to 2.86)
Having a quit intention		
No/not stated	1	1
Yes	0.59 (0.32 to 1.09)	0.52 (0.15 to 1.75)
Worrying that smoking will damage their health in the future		
Not worried/a little worried/ not stated	1	1
Moderately worried/very worried	**2.28 (1.15 to 4.50)**	1.22 (0.82 to 1.80)
Smoking can calm me down		
Disagree/strongly disagree	**2.05 (1.02 to 4.12)**	1.79 (0.87 to 3.67)
Agree/strongly agree	1	1
Not stated	0.26 (0.03 to 2.57)	1.70 (1.10 to 2.63)
Reason for choosing brand: taste		
No/not stated	1	1
Yes	0.89 (0.49 to 1.63)	1.52 (0.96 to 2.42)
Reason for choosing brand: it is less harmful to my health		
No/not stated	1	1
Yes	0.89 (0.47 to 1.69)	**3.52 (1.91 to 6.47)**

Bolded values indicate significant differences (tested at 0.05 significance level). All models controlled for sex, age groups, education, smoking status, type of cigarettes and time in sample.

of males smoking menthol cigarettes. Menthol smoking in Zambia was also associated with: (1) completing primary school (AOR 2.14; p=0.03), (2) being a non-daily smoker (AOR 2.29; p=0.03), (3) exclusively smoking FM cigarettes (AOR 14.71; p<0.001), (4) having attempted to quit in the past year (AOR 1.54; p=0.02), (5) believing that menthol cigarettes are less harmful (AOR 3.80; p<0.001) and (6) reporting choosing their brand because it was less harmful (AOR 3.52; p<0.001).

DISCUSSION

This study found that menthol use was high in both Zambia (48%) and Kenya (19%). Among the 25 ITC countries where the use of menthol cigarettes was measured, Zambia had the highest prevalence of menthol cigarette use, and Kenya had the third highest prevalence.[41] Zatoński *et al*[42] found that menthol use among smokers in eight ITC European countries in 2016 (before the EU's Tobacco Product Directive menthol ban in May 2020) ranged from 4% in Spain to 12% in England, which is considerably lower than Kenya and Zambia. The high prevalence of menthol cigarette use in Zambia is not surprising given that the Sweet Menthol brand of cigarettes, manufactured by Japan Tobacco International is the third most popular cigarette brand in Zambia and costs half the price of the other two most popular brands (ie, Pall Mall and Peter Stuyvesant).[33]

Consistent with previous research from HICs,[15–18 43] the current study found that in Zambia, menthol cigarette use is associated with beliefs that menthols are less harmful. This association is likely connected to a parallel relationship found in studies of light/low-tar cigarettes in China[44] and Zambia[45] showing that light/low tar cigarette smokers are more likely to believe that lights are less harmful and that lights are less harsh and smoother. The connection is reasonable since both lights and menthol cigarettes have design features that lead smokers to perceive these cigarettes as less harsh and smoother, and this lack of harshness is connected to beliefs that such cigarettes are less harmful. This connection between lower harshness and beliefs that menthols are less harmful has been noted among African-American smokers.[46]

Although menthol smokers in Kenya were not significantly more likely to believe that menthols are less harmful (although there was a trend in that direction), they were more likely to be concerned about the health effects of their smoking. Given that perceptions of the harmfulness of tobacco products are important predictors of use,[47] this provides further evidence to support a ban on cigarette advertising in Zambia and the need for a ban on menthol cigarettes in both countries.

Menthol smokers in Zambia were more likely to have made a past quit attempt. This finding is consistent with recent systematic reviews demonstrating that menthol cigarette smokers are less likely to succeed in quitting and more likely to relapse.[48] This finding is important because although Zambian menthol smokers are interested in quitting, there is a lack of affordable and accessible cessation programmes.[49]

Although smoking rates among males in both Zambia and Kenya are much higher than females, female smokers were more likely to smoke menthols. This greater prevalence of menthols among females is consistent with research in HICs.[7 10 42 50] Tobacco industry documents revealed that females prefer socially acceptable cigarettes with pleasant, fresh flavours because of how they mask the unpleasant stale odour of tobacco.[51] The finding that non-daily smokers were more likely to use menthol is also consistent with tobacco industry documents that showed that menthol was added mainly because it was known to attract inexperienced smokers who perceived it as less harsh and easier to smoke.[52] Given that menthol cigarettes have been associated with smoking initiation and experimentation, and the fact that in our study, females and those who did not smoke cigarettes daily (non-daily smokers) were more likely to be menthol cigarette smokers, it will be important to examine whether menthol cigarettes are encouraging smoking initiation in both countries, particularly among females and non-daily smokers. Although exclusively smoking FM cigarettes was associated with menthol use in Zambia, it was mainly due to the fact that menthol cigarettes were only available in FM cigarettes; there were no menthol-flavoured roll-your-own tobacco.

Strengths and limitations

Strengths of this study include a nationally representative sample of smokers in both Kenya and Zambia and inclusion of standardised measures associated with menthol use, which have been used in

over 20 ITC countries across all six WHO regions. Limitations of this study include the following: (1) the collection of data from the two countries was done at different time periods. We used these two data sets because they were the most recent waves in both countries. (2) We were not able to disentangle the dataset to reflect more categories, that is, 'menthol only', 'menthol with other flavours', 'other flavours only' and 'non-flavoured' as has been done in other studies because only 13 Kenyan respondents reported using 'other non-menthol flavours', (3) the use of cross-sectional analyses which limit inferences that can be drawn from the findings and (4) the use of self-reported survey data, which can result in some degree of unreliability and recall bias; however, it is not clear how such biases could affect the associations among the key measures and outcomes.

CONCLUSIONS

The current study demonstrates that the prevalence of menthol cigarette smoking is very high in both Kenya and Zambia relative to other countries where ITC surveys have been conducted. Menthol cigarettes appealed to females, non-daily smokers, health-concerned smokers and promoted the misperception that they are less harmful than non-menthol cigarettes. Moreover, menthol cigarette use was associated with increased likelihood of making a quit attempt. Two evaluation studies of Canada's menthol cigarette ban have shown that banning menthol cigarettes led to significant increases in quitting.[28 53 54] Those Canadian studies and this study provide support for banning menthol cigarettes in both Zambia and Kenya, including tobacco advertising in Zambia. There is need for additional resources to fund periodic mass media campaigns to reduce misperceptions of menthol. For example, it is important to highlight that just because something feels less harsh does not mean that it is less harmful. The media campaigns can also be used to educate the public on the harms of all other tobacco products. The provision of affordable and accessible cessation services will help many more Kenyan and Zambian smokers quit smoking, the leading cause of preventable disease and death in both countries.

What this paper adds

What is already known on this topic
► The harms of menthol cigarettes have been well established based on studies largely conducted in high-income countries; population studies on menthol use and on perceptions of menthol cigarettes in the African region have not been conducted.

What this study adds
► This International Tobacco Control Policy Evaluation Project study of nationally representative samples of adult smokers in Kenya and Zambia found high use of menthol cigarettes in Kenya and even higher in Zambia, relative to 23 other ITC countries, particularly among females, non-daily smokers and health-concerned smokers; menthol smokers were more likely than non-menthol smokers to wrongly believe that menthol cigarettes are less harmful.

How this study might affect research, practice or policy
► This study provides support for banning menthol cigarettes in both Zambia and Kenya and highlights the need for information campaigns in Africa to combat the myth that menthol cigarettes are less harmful.

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Supplemental material

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Tob Control

Supplemental Table S1. Prevalence distribution of potential predictors of menthol use among Kenyan and Zambian menthol smokers

Variables	Kenya (%) N=644	Zambia (%) N=602	*P* value (Kenya vs Zambia)
Have a past quit attempt (%Yes)	24.3	55.4	0.0002
Perception that menthol cigarettes are less harmful (%Agree/Strongly agree)	29.3	53.4	0.0037
Have an intention to quit smoking (%Yes)	45.2	74.9	0.0001
Worrying that smoking will damage my health in the future (%Moderately worried/ Very worried)	67.5	65.6	0.8308
Smoking can calm me down (%Agree/Strongly agree)	69.2	66.6	0.7651
Reason for choosing cigarette brand because of its taste (%Yes)	60.2	74.2	0.1354
Reason for choosing cigarette brand because it is less harmful to my health (%Yes)	32.6	32.7	0.9911

Note: percentages are adjusted by sex, age group, education, smoking status (daily / non-daily), cigarette type (Factory-Made/Roll-Your-Own), and time in sample.