

# Health needs in local government policies in Poland in the context of anti-smoking health policy programs

Anna Augustynowicz<sup>1,A,B,D,F</sup>, Aleksandra I. Czerw<sup>1,C,D,F</sup>, Andrzej Deptała<sup>2,3,E,F</sup>

<sup>1</sup> Department of Public Health, Faculty of Health Sciences, Medical University of Warsaw, Poland

<sup>2</sup> Department of Cancer Prevention, Faculty of Health Sciences, Medical University of Warsaw, Poland

<sup>3</sup> Department of Oncology and Hematology, Central Clinical Hospital of the Ministry of Interior, Warszawa, Poland

A – research concept and design; B – collection and/or assembly of data; C – data analysis and interpretation;

D – writing the article; E – critical revision of the article; F – final approval of the article

Advances in Clinical and Experimental Medicine, ISSN 1899-5276 (print), ISSN 2451-2680 (online)

*Adv Clin Exp Med.* 2018;27(12):1651–1659

## Address for correspondence

Aleksandra Czerw

E-mail: ola\_czerw@wp.pl

## Funding sources

None declared

## Conflict of interest

None declared

Received on June 21, 2016

Revised on July 26, 2016

Accepted on June 13, 2017

## Abstract

**Background.** According to the World Health Organization (WHO), every year tobacco smoking kills around 5.4 million people worldwide. Tobacco smoking is a major risk factor for cardiovascular diseases, respiratory diseases and cancer. In Poland, an average of 67,000 people die every year on account of smoking.

**Objectives.** The aim of the study was to evaluate the health security guaranteed by local governments based on an analysis of health policy programs associated with tobacco consumption, which were conducted in Poland from 2009 to 2014 by local governments.

**Material and methods.** The study was based on desk research. The data was sourced from the annual reports submitted to the Minister of Health, concerning the health policy programs which were carried out. The analysis covered programs whose name, objective or description of tasks indicated that they concerned tobacco smoking.

**Results.** The largest number of programs was completed in the West Pomeranian, Warmian-Masurian and Masovian voivodeships. The smallest number of programs were completed in Kuyavian-Pomeranian, Łódź and Opole voivodeships. The greatest number of programs were carried out by municipalities, followed by counties and county towns, and finally by self-governments of the voivodeships. The number of preventive programs was significantly greater than the number of other types of programs. The majority of programs were aimed at children; there were fewer programs dedicated to adults. The expenditure on the programs was the highest in self-governments of the voivodeships, while the lowest was in municipalities.

**Conclusions.** The steady growth in the number of anti-smoking programs completed in 2009–2014 was one of the factors that reduced tobacco smoking. In view of the mortality rates due to cardiovascular diseases, the inhabitants of Lublin and Warmian-Masurian voivodeships had their health needs addressed most efficiently. In the case of mortality rates due to tracheal, bronchial and lung cancer, the health needs of the inhabitants of Warmian-Masurian and West Pomeranian voivodeships were addressed most efficiently.

**Key words:** health promotion, tobacco smoking, local government, health policy program

## DOI

10.17219/acem/74756

## Copyright

Copyright by Author(s)

This is an article distributed under the terms of the

Creative Commons Attribution Non-Commercial License

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

## Background

Tobacco smoking is one of the most serious contemporary threats to civilization. According to the World Health Organization (WHO), tobacco smoking kills around 5.4 million people every year.<sup>1</sup> Without any action, by 2030 the number of deaths caused by tobacco smoking will exceed 8 million per year. More than 80% of those deaths will occur in developing regions.<sup>1</sup>

Tobacco smoking is a major risk factor for cardiovascular and respiratory diseases, as well as for cancer.<sup>1</sup>

Tobacco consumption is believed to be a risk factor for 6 out of the 8 most common causes of death in the world, i.e., ischemic heart disease, cerebrovascular disease, lower respiratory infection, chronic obstructive pulmonary disease (COPD), tuberculosis, as well as tracheal, bronchial and lung cancer. Smokers usually die of tracheal, bronchial or lung cancer, COPD, and ischemic heart disease.<sup>1</sup>

Despite regular preventive actions, an average of 67,000 people per year dies in Poland on account of smoking (51,000 men and 16,000 women).<sup>2</sup> The dominant causes of death among Poles are cardiovascular diseases and cancers.

In 2010, cardiovascular diseases claimed the lives of 174,003 people in Poland; they caused 456 deaths per 100,000 people.<sup>3</sup> Cardiovascular diseases accounted for around 46% of deaths in 2010 and 45.5% in 2011. They are also the main cause of premature death (before the age of 65).<sup>4</sup> It is estimated that with current incidence trends and the rate of aging of the Polish population, the number of deaths due to cardiovascular diseases will exceed 200,000 in 2020.<sup>5</sup>

The most common life-threatening types of malignant tumors among the Polish population are tracheal, bronchial and lung cancer, which claimed the lives of 22,374 people in 2010, i.e., 24% of all deaths due to malignant tumors.<sup>3</sup> In 2010, lung cancer accounted for 31.2% of deaths due to cancer among men and 15% of deaths among women.<sup>6</sup> In 2013, similarly, the largest percentage of cancer deaths among men and women were due to lung cancer – 30.6% and 15.9%, respectively.<sup>7</sup>

According to an analysis conducted by the WHO, there would be around 80% fewer cases of cardiovascular diseases, strokes and type 2 diabetes, and around 40% fewer cancer cases if we managed to eliminate the major risk factors, including tobacco smoking.<sup>8</sup>

In light of the data presented above, an assessment of the implementation of health policy programs aimed at reducing tobacco smoking in the Polish population seems appropriate.

## Objectives

The aim of the study was to evaluate how local governments addressed the health needs of their citizens by analyzing the health policy programs concerning tobacco product consumption completed in Poland between 2009 and 2014.

## Methods

The study was based on desk research. The data was sourced from the annual reports submitted by voivodes to the Minister of Health on the health policy programs implemented by local governments. The analysis covered all anti-smoking health policy programs completed from 2009 to 2014 – 1,482 programs in total.

The analysis covered programs whose name, objective or description of tasks indicated that they had concerned tobacco smoking. The programs were classified into one of 3 groups: preventive programs, diagnostic and therapeutic programs, and preventive, diagnostic and therapeutic programs. The classification into particular groups was based on the objective specified by the given local government, the type of program and the description of actions taken within the program. The analysis of the differences in the number of programs between voivodeships and the number of programs completed in particular years was based on a one-sample  $\chi^2$  test. The differences in terms of the number of programs completed between 2009 and 2014 by municipalities, counties and voivodeships were analyzed with Cochran's Q test, just as the differences in terms of specific programs completed in particular years. The differences in terms of the costs of programs realized depending on the type of program and the type of local government that implemented the program were analyzed by two-way analysis of variance (ANOVA). One-way ANOVA was applied for the evaluation of differences in the average values of expenditure on the programs in voivodeships in particular years.

## Results

Based on a  $\chi^2$  test for 1 sample, statistically significant differences concerning the number of programs implemented in particular voivodeships were found ( $\chi^2 [15] = 791.68, p < 0.001$ ).

The largest number of programs was implemented in West Pomeranian, Warmian-Masurian and Masovian voivodeships. The smallest number of programs was carried out in Kuyavian-Pomeranian, Łódź and Opole voivodeships (Fig. 1).

Based on a  $\chi^2$  test for 1 sample, statistically significant differences in terms of the number of programs implemented in the subsequent years were found ( $\chi^2 [5] = 24.34, p < 0.001$ ).

The number of programs implemented between 2013 and 2014 was higher than the number of programs implemented between 2009 and 2012 (Fig. 2).

Statistically significant dynamics of change were found in the number of programs implemented in subsequent years in Lower Silesian, Lublin, Lesser Poland, Masovian, Subcarpathian, Pomeranian, Silesian, Warmian-Masurian, Greater Poland, West Pomeranian, and Lubusz voivodeships. Such statistically significant dynamics of change

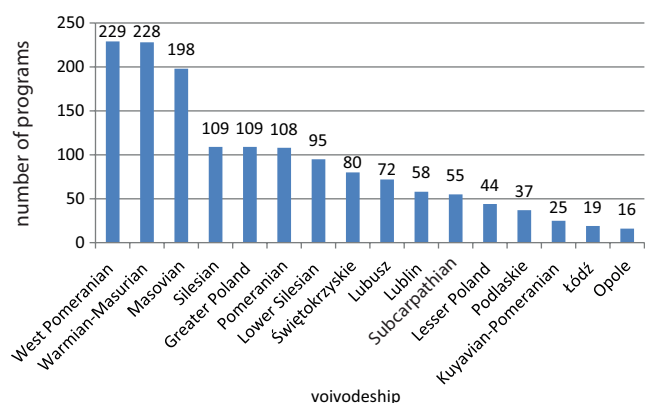


Fig. 1. Frequency distribution – the number of programs implemented in particular voivodeships between 2009 and 2014

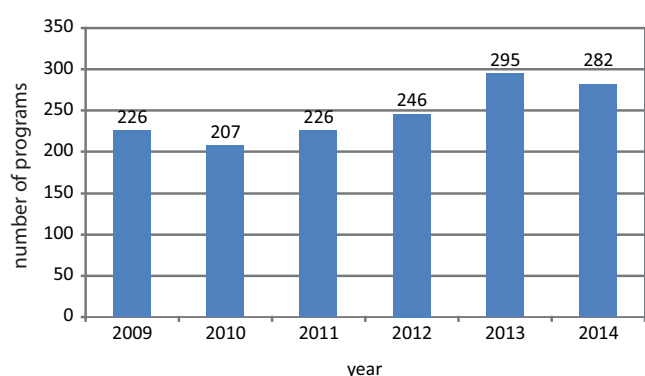


Fig. 2. Frequency distribution – the number of programs implemented between 2009 and 2014

were not found in the number of programs implemented in Kuyavian-Pomeranian, Łódź, Opole, Podlaskie, and Świętokrzyskie voivodeships (Table 1).

The number of programs implemented in subsequent years grew in Lower Silesian, Masovian, Warmian-Masurian, West Pomeranian, Greater Poland, and Lubusz voivodeships. The number of programs implemented in Łódź, Opole, Silesian, and Świętokrzyskie voivodeships dropped. The number of programs implemented in Lublin, Podlaskie, Pomeranian, and Subcarpathian voivodeships was found to have dropped, but then it increased (Table 1).

Based on Cochran's Q test, statistically significant differences in the number of programs implemented by particular local government units were found ( $Q(2) = 670.07$ ,  $p < 0.001$ ).

The largest number of programs were implemented by municipalities, followed by counties. The smallest number of programs was conducted by voivodeships (Fig. 3).

A statistically significant increase in the number of programs implemented by municipalities in subsequent years was found. No statistically significant changes were found in the number of programs implemented by counties and self-governments of the voivodeships (Table 2).

The analysis covered the variation of programs in terms of the type: preventive programs, diagnostic and therapeutic programs, or preventive, diagnostic and therapeutic programs (Fig. 4).

Based on Cochran's Q test, statistically significant differences in the number of programs implemented by particular local governments were found ( $Q(2) = 1,964.98$ ,  $p < 0.001$ ).

The number of preventive programs was significantly higher compared to diagnostic and therapeutic programs, and to preventive, diagnostic and therapeutic programs.

A statistically significant increase in the number of preventive programs implemented in subsequent years, and

Table 1. Frequency distribution – programs implemented in subsequent years in particular voivodeships

Variables	Year						Test		
Voivodeship	2009	2010	2011	2012	2013	2014	$\chi^2$	df	p-value
Lower Silesian	5	15	10	21	23	21	16.22**	5	0.006
Kuyavian-Pomeranian	7	7	3	3	3	2	5.96	5	0.310
Lublin	15	2	7	14	10	10	11.72*	5	0.039
Łódź	7	5	1	1	4	1	10.37	5	0.065
Lesser Poland	17	13	7	1	3	3	27.73***	5	0.000
Masovian	25	24	35	27	49	38	14.12*	5	0.015
Opole	3	5	2	3	2	1	3.50	5	0.623
Subcarpathian	2	5	13	23	8	4	33.04***	5	0.000
Podlaskie	7	5	3	6	4	12	8.24	5	0.143
Pomeranian	19	22	17	1	24	25	21.75**	5	0.001
Silesian	44	10	24	19	8	4	59.05***	5	0.000
Świętokrzyskie	20	15	15	13	10	7	7.60	5	0.180
Warmian-Masurian	21	26	26	43	56	56	32.89***	5	0.000
Greater Poland	8	19	28	10	18	26	18.10**	5	0.003
West Pomeranian	23	29	27	39	60	51	28.32***	5	0.000
Lubusz	3	5	8	22	13	21	27.33***	5	0.000

$\chi^2$  – chi-squared test; df – degree of freedom; p – statistical significance; \*p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001.

**Table 2.** Frequency distribution – programs implemented in subsequent years by local governments, with  $\chi^2$  test values for 1 sample

Local government unit	Year						Test		
	2009	2010	2011	2012	2013	2014	$\chi^2$	df	p-value
Municipality	117	103	129	153	176	173	32.10**	5	0.001
County	97	92	79	82	112	104	8.54	5	0.129
Self-governments of the voivodeships	14	12	5	9	7	5	8.00	5	0.156

$\chi^2$  – chi-squared test; df – degree of freedom; p – statistical significance; \*\*p < 0.01.

**Table 3.** Frequency distribution – preventive programs, diagnostic and therapeutic programs, and preventive, diagnostic and therapeutic programs implemented in subsequent years by local governments, with  $\chi^2$  test values for 1 sample

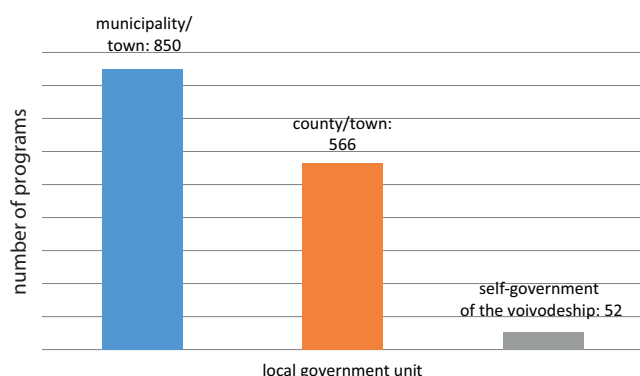
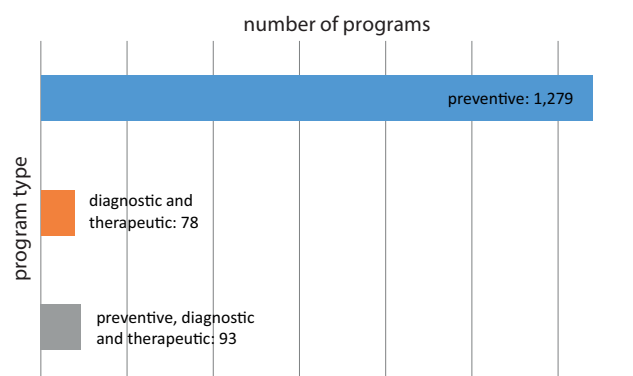
Program type	Year						Test		
	2009	2010	2011	2012	2013	2014	$\chi^2$	df	p-value
Preventive	166	161	185	231	275	263	57.91***	5	0.000
Diagnostic and therapeutic	19	14	15	10	16	9	5.12	5	0.401
Preventive, diagnostic and therapeutic	39	32	11	3	4	10	70.15***	5	0.000

$\chi^2$  – chi-squared test; df – degree of freedom; p – statistical significance; \*\*\*p < 0.001.

**Table 4.** The number of preventive programs, diagnostic and therapeutic programs, and preventive, diagnostic and therapeutic programs implemented by municipalities, counties and voivodeships

Program type	Local government unit			Test		
	municipality	county	voivodeship	Q	df	p-value
Preventive	759	499	22	654.92***	2	0.000
Diagnostic and therapeutic	42	29	11	17.73***	2	0.000
Preventive, diagnostic and therapeutic	48	35	19	12.79**	2	0.002

Q – Cochran's Q test value; df – degree of freedom; p – statistical significance; \*\*p < 0.01; \*\*\*p < 0.001.

**Fig. 3.** Frequency distribution – the number of programs implemented between 2009 and 2014 by local governments**Fig. 4.** Frequency distribution – the number of preventive programs, diagnostic and therapeutic programs, and preventive, diagnostic and therapeutic programs implemented between 2009 and 2014

a statistically significant decrease in the number of preventive, diagnostic and therapeutic programs were found (Table 3).

The associations between the types of programs (preventive programs, diagnostic and therapeutic programs, and preventive, diagnostic and therapeutic programs) and the type of local government (municipality, county and voivodeship) were also analyzed (Table 4).

It was found that the greatest number of programs, regardless of the type, were implemented by municipalities, while the smallest number of them were implemented by self-governments of the voivodeships.

The analysis also covered the variation of programs in terms of the population covered by a given program. The authors checked how many programs were aimed at children and teenagers, and how many at adults, as well as how many programs were dedicated to women, and how many to men (Fig. 5).

Based on Cochran's Q test, statistically significant differences in the number of programs aimed at adults, children, women, and men were found ( $Q(3) = 2,527.56$ ,  $p < 0.001$ ).

The largest number of programs were aimed at children.

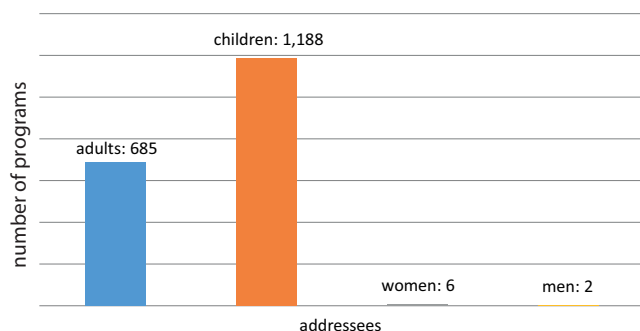


Fig. 5. Frequency distribution – the number of programs addressed to adults, children, women, and men implemented between 2009 and 2014

Table 5. Mean value of overall costs (in PLN) of preventive programs, diagnostic and therapeutic programs, and preventive, diagnostic and therapeutic programs in municipalities, counties and voivodeships

Variables	Local government unit		
	municipality	county	voivodeship
Preventive	6,982.47	51,653.32	28,332.94
Diagnostic and therapeutic	2,885.02	89,157.12	216,189.17
Preventive, diagnostic and therapeutic	10,758.69	28,329.78	168,732.58

There were fewer programs dedicated to adults. Only 6 programs were aimed specifically at women, and 2 were dedicated to men. Some programs were dedicated both to children and adults, which is why they were classified into both groups.

The analysis also covered the total costs of preventive programs, diagnostic and therapeutic programs, and preventive, diagnostic and therapeutic programs in municipalities, counties and voivodeships (Table 5).

Based on the analyses conducted under two-way ANOVA, statistically significant differences in terms of the costs of programs implemented by particular local governments were found ( $F(2.587) = 3.16$ ,  $p < 0.05$ ,  $\eta^2 = 0.01$ ). No statistically significant differences were found in terms of the costs depending on the type of program ( $F(2.587) = 1.28$ ,  $p > 0.05$ ), nor in terms of the costs depending on the type of program implemented by a municipality, county or voivodeship ( $F(4.587) = 0.78$ ,  $p > 0.05$ ).

The programs implemented by voivodeships entailed the highest costs. The programs implemented by counties cost less, while the programs implemented by municipalities cost the least (Fig. 6).

Based on the results of a one-way ANOVA, no statistically significant differences in the mean values of expenditure on anti-smoking programs in particular years were found ( $F(1.592) = 0.70$ ,  $p > 0.05$ ) (Table 6).

Based on the results of one-way ANOVA, statistically significant differences were found in the mean values of expenditure on anti-smoking programs in the Lublin were to implemented in particular years ( $F(5.38) = 3.23$ ,  $p < 0.05$ ,  $\eta^2 = 0.30$ ) (Table 7).

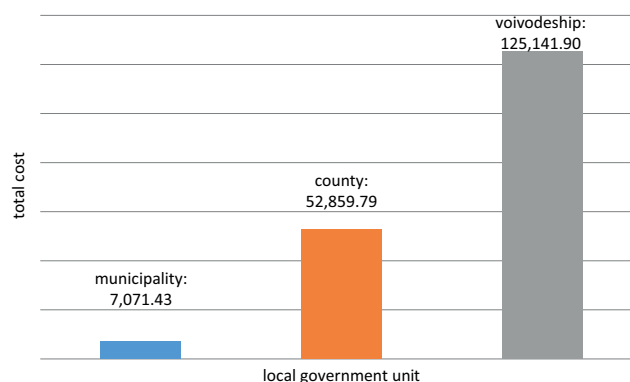


Fig. 6. Mean value of costs (in PLN) of programs implemented by municipalities, counties and voivodeships

Table 6. Mean value of expenditure (in PLN) on anti-smoking programs in particular years

Year	M	SD	n
2009	46,488.30	405,518.95	187
2010	33,414.05	173,804.10	105
2011	90,754.79	529,147.92	68
2012	5,499.41	17,326.73	84
2013	24,135.07	104,926.08	82
2014	25,507.68	107,811.46	72
Total	37,877.41	302,283.12	598

M – mean value; SD – standard deviation; n – number of programs.

The expenditure in 2010 was statistically higher than the expenditure incurred in the other years.

There were statistically significant differences in the mean values of expenditure on anti-smoking programs in Łódź Voivodeship implemented in particular years ( $F(4.11) = 25.02$ ,  $p < 0.001$ ,  $\eta^2 = 0.90$ ) (Table 8).

The expenditure in 2014 was statistically higher than the expenditure incurred in the other years.

There were statistically significant differences in the mean values of expenditure on anti-smoking programs in Subcarpathian Voivodeship implemented in particular years ( $F(4.20) = 16.80$ ,  $p < 0.001$ ,  $\eta^2 = 0.77$ ) (Table 9).

Table 7. Mean value of expenditure (in PLN) on anti-smoking programs in Lublin Voivodeship in particular years

Year	M	SD	n
2009	10,869.93	23,710.77	14
2010	113,900.00	158,533.34	2
2011	770.00	625.81	7
2012	903.35	1,109.70	8
2013	25,319.69	65,039.83	7
2014	794.14	1,094.89	6
Total	13,059.06	43,785.53	44

M – mean value; SD – standard deviation; n – number of programs.



**Table 8.** Mean value of expenditure (in PLN) on anti-smoking programs in Łódź Voivodeship in particular years

Year	M	SD	n
2009	21,636.31	48,202.18	6
2010	1,710.30	730.63	4
2011	65,000.00	.	1
2012	–	–	–
2013	12,789.50	15,614.60	4
2014	357,750.00	.	1
Total	38,160.44	91,190.50	16

M – mean value; SD – standard deviation; n – number of programs.

**Table 9.** Mean value of expenditure (in PLN) on anti-smoking programs in Subcarpathian Voivodeship in particular years

Year	M	SD	n
2009	105,219.90	35,666.32	2
2010	66,839.43	80,383.09	2
2011	–	–	–
2012	571.38	1,149.19	16
2013	570.00	.	1
2014	152.50	153.05	4
Total	14,177.63	37,534.09	25

M – mean value; SD – standard deviation; n – number of programs.

The expenditure in 2009–2010 was statistically higher than the expenditure incurred in the other years.

## Discussion

The results of research conducted in recent years point to a reduction in the spread of tobacco smoking in Poland. In 2004, the percentage of smokers was 30.1%, while in 2009 it was 29.2%.<sup>9,10</sup> Over the next 5 years, the percentage of smokers dropped by more than 3% and reached 26.1% in 2014.<sup>11</sup> The reduction in the consumption of tobacco is a consequence of legislative actions and all kinds of activities carried out at the national, regional and local levels. This positive trend should be continued in the future.

For cardiovascular diseases, there was the National Program of Prevention and Treatment of Cardiovascular Diseases for 2003–2005, 2006–2008, 2009, and 2010–2012, as well as the National Program of Equal Access to Prevention and Treatment of Cardiovascular Diseases for 2013–2016.<sup>12–16</sup> The programs provided education aimed at the entire society and focused on raising the awareness of risk factors for cardiovascular diseases, including tobacco smoking. For cancers, there was the National Cancer Control Programme, in effect from 2005 to 2015.<sup>17</sup> This program continues as the National Cancer Control Programme for 2016–2024.<sup>18</sup> Those programs provide for actions aimed at health promotion and cancer prevention,

including actions focused on the reduction of tobacco smoking. According to the assumptions of the programs, they should be supported by regional and local initiatives, scientific associations, and non-government organizations.

The implementation of local government health policy programs concerning tobacco smoking is an example of regional and local actions. In the period covered by this analysis, the most health policy programs were implemented by municipalities and the fewest by voivodeships. The greatest expenditure on the implementation of anti-smoking programs was incurred by voivodeships, while municipalities spent the least. The structure of expenditure incurred by particular local governments may suggest that the funds are first of all allocated for fulfilling the obligatory health protection tasks defined by law.<sup>19–21</sup>

Most of the programs implemented by local governments from 2009 to 2014 were preventive programs. In 2002, the WHO estimated the proportional contribution of particular risk factors in the overall number of deaths in European countries. Tobacco smoking proved to be a major risk factor in Poland.<sup>22–24</sup> According to the estimates made by the WHO, risk factors accounted for around 55% of deaths in Poland and nearly 40% of years that could have otherwise been lived in health.<sup>23</sup> In this context, the implementation of preventive programs by local governments, and the statistically significant annual increase in the number of preventive programs implemented in subsequent years, should be viewed as positive. The implementation of preventive programs remains in line with the guidelines for effectively fighting tobacco smoking listed in the World WHO's MPOWER policy. The policy aims to protect people from tobacco smoke and to warn them about the dangers of tobacco smoke.<sup>1</sup> The implementation of preventive programs by local governments is in line with the guidelines set forth in the Strategy for Fighting Cancer in Poland for 2015–2024 and the White Book report.<sup>25,26</sup> One of the objectives of the strategy is to prevent cancers caused by tobacco smoking by disseminating information on the negative effects of smoking, specifically among minors.

In the period covered by this analysis, the greatest number of anti-smoking health policy programs were implemented in West Pomeranian, Warmian-Masurian and Masovian voivodeships, while the smallest number of such programs were implemented in Kuyavian-Pomeranian, Łódź and Opole voivodeships. Taking into account the territorial variation, one can conclude that the fewest regular smokers live in Subcarpathian and Lesser Poland voivodeships – around 18% of the adult population. The greatest number of smokers live in Lower Silesian, Kuyavian-Pomeranian, Lubusz, and West Pomeranian voivodeships, where the percentage of regular smokers is 10% higher.<sup>10</sup> Among the voivodeships with the highest percentage of smokers, only West Pomeranian Voivodeship properly addressed the health needs of its inhabitants arising from tobacco consumption. In the period covered by this analysis, the voivodeship implemented

the most anti-smoking health policy programs: 229. From 2009 to 2014, Lower Silesian Voivodeship implemented 95 programs, Lubusz 58, and Kuyavian-Pomeranian only 25. In those voivodeships, the health needs of the inhabitants were not addressed properly.

The analysis also covered the implementation of health policy programs in terms of satisfying the health needs of the inhabitants arising from diseases caused by tobacco smoking.

In 2009 and 2010, the mortality rates due to cardiovascular diseases were the highest in Świętokrzyskie (over 397/100,000), Łódź (over 374/100,000) and Lublin voivodeships. The lowest mortality rates were recorded in Pomeranian (over 281/100,000), Podlaskie (over 304/100,000) and Greater Poland (323/100,000) voivodeships. From 2000 to 2010, the mortality rates due to cardiovascular diseases in Poland dropped by 21%, and the decrease was the most significant in Pomeranian (by 30%) and Silesian (by 29%) voivodeships. The least significant improvement was recorded in Warmian-Masurian (by only 2%) and in Świętokrzyskie (by 6%) voivodeships.<sup>3</sup> In 2012, the highest mortality rates due to cardiovascular diseases were recorded in Silesian, Świętokrzyskie and Lublin voivodeships (over 490/100,000), and the rate was around 25% higher than in Podlaskie Voivodeship, where the lowest rates were recorded (394/100,000).<sup>5</sup> Although the mortality rates in Świętokrzyskie and Łódź voivodeships ranked among the highest, local governments did not increase the number of anti-smoking health policy programs in subsequent years. A downward trend was observed in Świętokrzyskie and Łódź voivodeships from 2009 to 2014. Those voivodeships failed to properly address the health needs of their inhabitants. The actions taken by the local governments of Lublin and Warmian-Masurian voivodeships must be viewed as positive.

The greatest incidence of lung cancer in 2009 was recorded in Warmian-Masurian, Pomeranian and Kuyavian-Pomeranian voivodeships for men, and in Pomeranian, Warmian-Masurian and Kuyavian-Pomeranian voivodeships for women (63/100,000 and 20/100,000, respectively).<sup>27</sup> In 2012, the highest incidence among men was recorded in Warmian-Masurian, Kuyavian-Pomeranian (over 65/100,000) and Pomeranian (over 58/100,000) voivodeships; the highest incidence among women was found in Warmian-Masurian (over 24/100,000) and Kuyavian-Pomeranian voivodeships (over 23/100,000).<sup>9,28</sup> Local governments in West Pomeranian and Warmian-Masurian voivodeships addressed the health needs of the inhabitants most effectively. The activity of local governments in Kuyavian-Pomeranian Voivodeship, who implemented only 25 programs despite high incidence rates, should be viewed as negative. One could also expect a higher number of anti-smoking health policy programs in Pomeranian Voivodeship.

The highest mortality rates due to tracheal, bronchial and lung cancer in 2009–2010 were recorded

in Warmian-Masurian, Lubusz (over 195/100,000), Łódź (over 204/100,000), and Kuyavian-Pomeranian (209/100,000) voivodeships. The most favorable situations were recorded in Subcarpathian (over 160/100,000), Opole, Świętokrzyskie, and Lesser Poland (over 168/100,000) voivodeships. In Podkarpackie Voivodeship, where the recorded mortality rates due to tracheal, bronchial and lung cancer in 2000–2001 and 2009–2010 were the lowest in the country, the mortality was 25% lower than the national average, and 42% lower than in Warmian-Masurian Voivodeship.<sup>3</sup> In 2012, the highest standardized mortality ratios due to lung cancer among men were recorded in Warmian-Masurian (over 68/100,000), Kuyavian-Pomeranian (over 62/100,000) and Masovian (over 58/100,000) voivodeships, whereas among women the highest standardized mortality ratios due to lung cancer were recorded in Warmian-Masurian, West Pomeranian and Kuyavian-Pomeranian voivodeships (over 20/100,000).<sup>28</sup> The greatest mortality among the general population due to respiratory diseases, including chronic lower respiratory diseases, from 2000 to 2010, was recorded in Warmian-Masurian Voivodeship. The significant increase in mortality rates between 2000 and 2010 recorded in this voivodeship – which reached 40% of the general population – was alarming. In this context, Warmian-Masurian, West Pomeranian and Masovian voivodeships, which from 2009 to 2014 implemented the most anti-smoking health policy programs, addressed the health needs of inhabitants most effectively. It was quite the contrary in Kuyavian-Pomeranian Voivodeship. This was one of the 3 voivodeships that implemented the fewest anti-smoking health policy programs between 2009 and 2014.

The analysis also covered the mean value of expenditure on anti-smoking programs in particular voivodeships. It was found that there were significant differences in this respect in Lublin, Łódź and Subcarpathian voivodeships in the period covered by our analysis. The lowest force of mortality in Poland due to tracheal, bronchial and lung cancer in 2009–2010 was recorded in Subcarpathian voivodeship. A reasonably favorable situation in this respect was also observed in Lublin Voivodeship: the mortality rates in 2009–2010 were lower than the national average. The significantly higher expenditure from 2009 to 2014 in Lublin and Subcarpathian voivodeships – in the context of attempting to further decrease mortality rates due to cardiovascular diseases – should be viewed as positive. The highest expenditure on anti-smoking health policy programs in Łódź Voivodeship was incurred in 2014. The increase in the expenditure in Lublin Voivodeship in 2010 and in Łódź Voivodeship in 2014 seems justified in view of the high mortality rates due to cardiovascular diseases. In 2009–2010, the highest mortality rates due to cardiovascular diseases were recorded in Świętokrzyskie, Łódź and Lublin voivodeships.

The analysis also covered the number of health policy programs dedicated to children and teenagers. The most

serious aspects of tobacco smoking in Poland include the decreasing age of children who experiment with cigarettes, some of whom become regular smokers, the steady number of female smokers, including pregnant women and young mothers, and passive smoking, specifically among children. That final aspect becomes even more serious when one considers that, according to recent data, inhaling tobacco smoke is just as dangerous – or even more dangerous – than active smoking.<sup>29</sup> The scale of passive exposure of children to tobacco smoke in Poland is massive: every day around 4 million Polish children inhale tobacco smoke at home or in public places.<sup>29</sup> According to 2009 data, nearly 1/4 of children aged 0–14 were exposed to tobacco smoke. One third of young people aged 15–29 were exposed to passive smoking.<sup>30</sup> The results of a study of 2003 indicate that 64% of boys and 53% of girls aged 13–15 have smoked at least once in their life, while 30% of boys and 21% of girls had tried smoking before they reached the age of 10.<sup>29</sup> In 2009, 11.8% of people aged 15–19 admitted that they smoked, and 7.3% of them smoked every day.<sup>30</sup> In the period covered by the analysis, the number of anti-smoking health policy programs aimed at children reached 1,188. There were 685 programs aimed at adults. This structure seems reasonable, taking into consideration the growing problem of tobacco smoking among children and teenagers and the exposure of this group to tobacco smoke.

The experience of other EU member states demonstrates that the best effects are obtained by a long-term policy implemented on many levels. It covers legislative, preventive and controlling actions, as well as addiction therapy.<sup>31</sup> These actions require the interaction of many entities – central authorities, local governments and non-government organizations. The highest smoking cessation success rates (>45%) were recorded in Sweden, UK, the Netherlands, Belgium, and France. Those are the countries that have a well-developed smoking restriction policy. The smoking cessation success rates were relatively low (<30%) in Lithuania and Latvia. The smoking restriction policies that most frequently led to smoking cessation included a pricing policy and a ban on the advertising of tobacco products.<sup>32</sup> On the other hand, as a result of the long-term prevention of cancer in some EU member states, there is a high incidence of smoking-related diseases arising from high cancer detection rates, low or medium mortality, high 5-year survival rates, and high prevalence. This applies to France, Germany, Norway, Italy, Switzerland, and the UK. In Finland and Sweden, the low risk of lung cancer results from successful long-term anti-smoking campaigns.<sup>31</sup> Europe's experience demonstrates that anti-smoking programs of a preventive nature should be implemented on a micro-, macro- and meso-level. In the first step, factors which encourage young girls and boys or men and women to smoke must be identified. Preventive health policy programs, potentially dedicated to a specific sex, should then be aimed at eliminating that factors.<sup>33</sup>

## Conclusions

The growing number of anti-smoking programs implemented from 2009 to 2013 is one of the factors that led to a decrease in tobacco smoking in Poland. In terms of mortality rates due to cardiovascular diseases, local governments in Lublin and Warmian-Masurian voivodeships addressed the health needs of the local population most effectively. In terms of mortality rates due to tracheal, bronchial and lung cancer, the health needs of the inhabitants of Warmian-Masurian and West Pomeranian voivodeships were addressed most effectively. The anti-smoking programs addressed the problem of the growing incidence of tobacco smoking mainly among children and teenagers.

## References

1. WHO Global Tobacco Epidemic – WHO report. MPOWER package. Report summary. [www.who.int/tobacco/mpower/2008/en](http://www.who.int/tobacco/mpower/2008/en); Accessed March 15, 2016.
2. Peto R, Lopez AD, Boreham J, Thun M, Heath Jr C. *Mortality From Smoking In Developed Countries 1950–2000*. Oxford, UK: Oxford University Press; 2012.
3. Wojtyniak B, Stokwiszewski J, Goryński P, Poznańska A. Długość życia i umieralność ludności Polski (w): Sytuacja zdrowotna ludności Polski i jej uwarunkowania [Life expectancy and mortality of the Polish population. In: Wojtyniak B, Goryński P, Moskalewicz B, eds. *Health Situation Of The Polish Population and Its Determinants*]. National Institute of Public Health – National Institute of Hygiene: Warszawa, Poland; 2012: 38–122.
4. National Program for Equalization of Accessibility to Prevention and Treatment of Cardiovascular Diseases POLKARD for 2013–2016. Warsaw, Poland; 2015. <https://www.gov.pl/zdrowie/program-profilaktyki-i-leczenia-chorob-ukladu-sercowo-naczyniowego-polcard>; Accessed March 15, 2016.
5. Zachorowania i umieralność na choroby układu krążenia a sytuacja demograficzna Polski [Morbidity and mortality from cardiovascular disease and the demographic situation of Poland]. Government Population Council: Warszawa, Poland; 2015.
6. Didkowska J, Wojciechowska U, Zatoński W. Nowotwory złośliwe w Polsce w 2010 roku [Cancer in Poland in 2010]. Publication issued under the task "Registration of cancer conducted by the National Cancer Control Programme". Warszawa, Poland; 2012. [http://onkologia.org.pl/wp-content/uploads/Nowotwory\\_2010.pdf](http://onkologia.org.pl/wp-content/uploads/Nowotwory_2010.pdf). Accessed March 12, 2016.
7. Didkowska J, Wojciechowska U. Nowotwory złośliwe w Polsce w 2013 roku [Cancer in Poland in 2013]. Publication issued under the task "Registration of cancer conducted by the National Cancer Control Programme". Warszawa, Poland; 2015. <http://onkologia.org.pl/wp-content/uploads/BIUL2013.pdf>. Accessed March 12, 2016.
8. WHO report. Gaining Health. The European Strategy for the Prevention and Control of Non-communicable Diseases 2006 <http://www.euro.who.int/en/publications/abstracts/gaining-health-the-european-strategy-for-the-prevention-and-control-of-noncommunicable-diseases>; Accessed March 15, 2016.
9. Stan zdrowia ludności Polski w przekroju terytorialnym w 2004 r. [The health status of the Polish population by territorial division in 2004]. Statistics Poland: Warszawa, Poland; 2007. [http://stat.gov.pl/cps/rde/xbcr/gus/stan\\_zdrowia\\_2004\\_teryt.pdf](http://stat.gov.pl/cps/rde/xbcr/gus/stan_zdrowia_2004_teryt.pdf). Accessed March 12, 2016.
10. Piekarszewska M. Styl życia (w): Stan zdrowia ludności Polski w 2009 r. [Lifestyle. In: Koehne N, Lednicki B, Piekarszewska M, Wiczorek R, Zajenkowski A, eds. *The Health Status of the Polish Population in 2009*. Statistics Poland: Warszawa 2011: 62–68.
11. Zdrowie i zachowania zdrowotne mieszkańców Polski w świetle Europejskiego Ankietowego Badania Zdrowia (EHIS) 2014 [Health and health behaviors of Polish citizens in the light of the European Health Interview Survey (EHIS) 2014]. Statistics Poland: Warszawa, Poland; 2016. <http://stat.gov.pl>. Accessed March 12, 2016.



12. National Program for Prevention and Treatment of Cardiovascular Diseases for 2003–2005 POLKARD. Warszawa, Poland; 2003. <http://www.archiwum.mz.gov.pl/zdrowie-i-profilaktyka/programy-zdrowotne/wykaz-programow/narodowy-program-wyrownywania-dostpności-do-profilaktyki-i-leczenia-chorob-ukadu-sercowo-naczyniowego-polgard>; Accessed March 15, 2016.
13. National Program for Prevention and Treatment of Cardiovascular Diseases for 2006–2008 POLKARD. Warsaw 2005. <http://www.archiwum.mz.gov.pl/zdrowie-i-profilaktyka/programy-zdrowotne/wykaz-programow/narodowy-program-wyrownywania-dostpności-do-profilaktyki-i-leczenia-chorob-ukadu-sercowo-naczyniowego-polgard>; Accessed March 15, 2016.
14. National Program for Prevention and Treatment of Cardiovascular Diseases for 2009 POLKARD. Warszawa, Poland; 2009. <http://www.archiwum.mz.gov.pl/zdrowie-i-profilaktyka/programy-zdrowotne/wykaz-programow/narodowy-program-wyrownywania-dostpności-do-profilaktyki-i-leczenia-chorob-ukadu-sercowo-naczyniowego-polgard>; Accessed March 15, 2016.
15. National Program for Prevention and Treatment of Cardiovascular Diseases for 2010–2012 POLKARD. Warszawa, Poland; 2010. <http://www.archiwum.mz.gov.pl/zdrowie-i-profilaktyka/programy-zdrowotne/wykaz-programow/narodowy-program-wyrownywania-dostpności-do-profilaktyki-i-leczenia-chorob-ukadu-sercowo-naczyniowego-polgard>; Accessed March 15, 2016.
16. National Program for Equalization of Accessibility to Prevention and Treatment of Cardiovascular Diseases POLKARD for 2013–2016. Warszawa, Poland; 2015. <https://www.gov.pl/zdrowie/program-profilaktyki-i-leczenia-chorob-ukladu-sercowo-naczyniowego-polgard>; Accessed March 15, 2016.
17. 17 Act of July 1, 2005 on Establishing a Multiannual Program “National Program for Fighting Cancer” (Dz.U.05.143.1200) text in Polish.
18. Resolution of the Cabinet No. 208 as of November 3, 2015 on Establishing a Multiannual Program for 2016–2024 entitled “National Program for Fighting Cancer”, (M.P. 2015. 1165). text in Polish.
19. Zdrowie i Ochrona Zdrowia w 2011 r. [Health and Health Care in 2011]. Central Statistical Office of Poland: Warszawa, Poland; 2012. [http://stat.gov.pl/cps/rde/xbcr/gus/zo\\_zdrowie\\_i\\_ochrona\\_zdrowia\\_w\\_2011.pdf](http://stat.gov.pl/cps/rde/xbcr/gus/zo_zdrowie_i_ochrona_zdrowia_w_2011.pdf). Accessed March 12, 2016.
20. Zdrowie i Ochrona Zdrowia w 2013 r. [Health and Health Care in 2013]. Central Statistical Office of Poland: Warszawa, Poland; 2014. <http://stat.gov.pl/obszary-tematyczne/zdrowie/zdrowie/zdrowie-i-ochrona-zdrowia-w-2013-r-,1,4.html>. Accessed March 12, 2016.
21. Zdrowie i Ochrona Zdrowia w 2014 r. [Health and Health Care in 2014]. Central Statistical Office of Poland: Warszawa, Poland; 2015. <http://stat.gov.pl/obszary-tematyczne/zdrowie/zdrowie/zdrowie-i-ochrona-zdrowia-w-2013-r-,1,4.html>. Accessed March 12, 2016.
22. Badura B. What is and what determines health. In: Laaser U, de Leeuw E, Stock Ch, eds. *Scientific Foundations for Public Health Policy in Europe*. Juventa Verlag: Munich, Germany; 1995.
23. WHO Europe. The European Health Report 2005: Public health action for healthier children and populations. [http://www.euro.who.int/\\_\\_\\_data/assets/pdf\\_file/0004/82435/E87325.pdf](http://www.euro.who.int/___data/assets/pdf_file/0004/82435/E87325.pdf). Accessed March 12, 2016.
24. WHO. Global Strategy on Diet, Physical Activity and Health. Geneva, Switzerland; 2004. [http://www.who.int/gb/ebwha/pdf\\_files/WHA57/A57\\_R17-en.pdf](http://www.who.int/gb/ebwha/pdf_files/WHA57/A57_R17-en.pdf). Accessed March 12, 2016.
25. Strategy for Fighting Cancer in Poland 2015–2024. PWC. Warsaw, Poland; 2014 <http://www.walkazakiem.pl>; Accessed March 15, 2016.
26. Biała Księga. Zwalczanie raka jelita grubego i raka piersi w Polsce na tle wybranych krajów europejskich. Analiza zasobów systemu opieki onkologicznej i czynników warunkujących sukces [White Book. Fighting colorectal cancer and breast cancer in Poland in comparison to selected European countries. Resource analysis of the oncological care system and success factors]. Center for University Research: Warszawa–Kraków, Poland; 2011.
27. Didkowska J, Wojciechowska U, Zatoński W. Nowotwory złośliwe w Polsce w 2009 roku [Cancer in Poland in 2009]. Publication issued under the task “Registration of cancer conducted by the National Cancer Control Programme”. Warszawa, Poland; 2011. [http://onkologia.org.pl/wp-content/uploads/Nowotwory\\_2009.pdf](http://onkologia.org.pl/wp-content/uploads/Nowotwory_2009.pdf). Accessed March 12, 2016.
28. Didkowska J, Wojciechowska U, Zatoński W. Nowotwory złośliwe w Polsce w 2012 roku [Cancer in Poland in 2012]. Publication issued under the task “Registration of cancer conducted by the National Cancer Control Programme”. Warszawa, Poland; 2014 <http://onkologia.org.pl/wp-content/uploads/Biul2012net.pdf>. Accessed March 12, 2016.
29. Present danger of tobacco epidemic in Poland. WHO Regional Office for Europe [http://www2.mz.gov.pl/wwwfiles/ma\\_struktura/docs/raport\\_epidemia\\_16082010.pdf](http://www2.mz.gov.pl/wwwfiles/ma_struktura/docs/raport_epidemia_16082010.pdf). Accessed March 12, 2016.
30. Zdrowie dzieci i młodzieży w Polsce w 2009 r. [Health of children and adolescents in Poland in 2009]. Statistics Poland, Statistical Office in Kraków: Kraków, Poland; 2011. [http://stat.gov.pl/cps/rde/xbcr/gus/zo\\_zdrowie\\_dzieci\\_mlodziwy\\_w\\_polsce\\_2009.pdf](http://stat.gov.pl/cps/rde/xbcr/gus/zo_zdrowie_dzieci_mlodziwy_w_polsce_2009.pdf). Accessed March 12, 2016.
31. Bielska-Lasota M, Car J, Rzepczak-Zacharek E. Obciążenie nowotworami złośliwymi w Polsce na tle krajów Unii Europejskiej (w): Sytuacja zdrowotna ludności Polski i jej uwarunkowania. [Burden of cancer in Poland in comparison to other Member States. In: Wojtyński B, Goryński P, Moskalewicz B, eds. *Health Situation Of The Polish Population and Its Determinants*]. National Institute of Public Health – National Institute of Hygiene: Warszawa, Poland; 2012:38–122.
32. Schaap MM, Kunst AE, Leinsalu M, et al. Effect of nationwide tobacco control policies on smoking cessation in high and low educated groups in 18 European countries. *Tobacco Control*. 2008;17:248–255.
33. de Vries H, Mudde A, Leijts I, et al. The European Smoking Prevention Framework Approach (EFSA): an example of integral prevention. *Health Educ Res*. 2003;18(5):611–626.