

REVIEW ARTICLE

EPIDEMIOLOGY OF ENT DISORDERS IN ADULT POPULATION OF AGRICULTURAL REGION

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ABSTRACT

The aim: To study and analyze Sumy region population morbidity dynamics taking into account current stage of medical reform. Sumy region here is represented as one of the main agricultural regions of Ukraine. The prevalence of ENT disorders (otolaryngologic diseases) was studied.

Materials and methods: During the study we used data of statistical report of Public Health Board, Sumy State Administration for the period from 2015 to 2019 years by administrative territories. Obtained results were processed, using general statistics methods and analyzed, using structural-logical analysis.

Conclusions: The study found that the morbidity rates of ENT disorders in adult population during the study period increased and had levels of 2113.0 and 122.1 per 100 thousand adult population, respectively, and the prevalence rates and the prevalence rates of ENT disorders among the adult population decreased, respectively to 167.7; 2113.0; 665.1 and 389.9. All indicators have reliable differences in terms of administrative territories of the region.

The results of the study should be taken into account in the process of reforming the otolaryngological service in the region.

KEY WORDS: agricultural region, adult population, ENT disorders, morbidity, prevalence, index

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INTRODUCTION

Ukraine now is in the middle of the process of reforming the country's health system [1] with the priority development of primary health care based on the principles of general medical practice – family medicine [2,3], the recognition of a general practitioner-family doctor as a doctor of first contact within the health system [4].

The second important direction of the reform is the introduction of a program of state guarantees of free medical care [5], accompanied by changes in the organization of activities and financing of health institutions [6].

At the same time, the need of the population in certain types of medical care that are determined by the morbidity and diseases prevalence levels in the population, is important in planning of the network and resources of health institutions.

In determining the relevance of the topic of the study, we assumed that ENT diseases are ones of the most common in the population [7, 8].

THE AIM

Investigate and analyze the dynamics of the morbidity in adult population of the Sumy region of Ukraine, as an agricultural region, and the prevalence of ENT diseases in them, taking into account the present stage of the health sector reform.

MATERIALS AND METHODS

During the study, data from the sectoral statistical reporting of the Health Department of the Sumy State

Administration for the period 2015-2019 in the context of administrative territories were used.

The results obtained during the study were processed using conventional statistical methods and analyzed using the structural logic analysis method.

This study was approved by the ethics committee of the Sumy State University, which determined that the general ethical rules of humane treatment of patients were observed when working with patients in accordance with the requirements of the Tokyo Declaration of the World Medical Association and the International Recommendations of the Helsinki Declaration of Human Rights.

REVIEW AND DISCUSSION

At the first stage of the study, an analysis of the morbidity rates in adult population of the Sumy region with ENT diseases was carried out.

Table 1 demonstrates data on the morbidity rates in adult population of the region with ear diseases by the administrative territories of the region in the dynamics of 2015-2019 (Table 1).

An analysis of the data presented in Table 1 indicates that in the whole area, the morbidity rate in adult population with ear disease increased by 47.1% and equals 2113.0 per 100 adults. At the same time, increasing of this index was recorded in the territory of 17 (94.4%) rural administrative territories and 4 (57.1%) cities (towns) of the region. The largest level of index increasing was recorded in the territory of the Seredyna-Buda district (347.6%) which equals 496.7 per 100 adults.

Table 1. Sumy region ear diseases morbidity rate in adult population, 2015-2019 yrs. (per 100 thousand of adult population)

Administrative territory	years/rates (indexes)					2019 to 2015 yrs. %
	2015	2016	2017	2018	2019	
Sumy region	1436,4	1489,2	1509,2	1363,8	2113,0	147,1
<i>Districts of the region</i>						
Bilopillia	1645,4	1681,1	1682,0	1621,8	2488,1	151,2
Buryn	1617,1	1665,8	1555,8	1541,8	3331,7	206,0
Velyka Pysarivka	775,9	654,8	988,0	1524,2	2103,0	271,0
Hlukhiv	1233,7	1002,3	862,7	862,1	1365,8	110,7
Konotop	1248,3	1270,3	1405,7	1274,4	1736,5	139,1
Krasnopillia	593,3	1075,0	795,7	783,4	1540,9	259,7
Krolevets	2279,7	2359,5	2253,9	1984,1	3407,2	149,5
Lebedyn	1264,5	1812,1	1218,7	1485,8	2320,6	183,5
Lypova Dolyna	1219,4	1429,9	1256,8	1121,8	2257,8	185,2
Nedryhailiv	706,0	-	28,8	203,7	635,6	90,0
Okhtyrka	1312,8	1503,2	1509,2	1488,2	1961,4	149,4
Putyvl'	1007,0	823,9	1127,8	1360,9	1968,1	195,4
Romny	1657,5	1899,2	2251,4	2633,8	3577,0	215,8
Seredyna-Buda	142,9	333,6	1063,8	1680,6	496,7	347,6
Sumy	1399,5	1421,4	1420,6	1421,7	2492,2	178,1
Trostianets	1132,6	1644,7	1546,4	1894,1	2814,5	248,5
Shostka	1371,6	1268,3	1520,9	1463,8	2230,4	162,6
Yampil	572,5	743,9	-	-	1541,2	269,2
<i>Towns of the region</i>						
Sumy (city)	1889,5	1879,7	1804,9	997,4	1807,5	95,7
Hlukhiv (town)	1585,0	1303,7	1129,4	1244,5	1390,1	101,0
Konotop (town)	1376,8	1422,4	1629,2	1449,1	1375,9	99,9
Lebedyn (town)	1773,2	2178,0	1585,5	1823,1	1430,1	80,6
Okhtyrka (town)	1684,8	1794,3	1787,7	1841,9	1849,4	109,8
Romny (town)	2252,1	2220,7	2649,1	3275,5	3761,3	167,0
Shostka (town)	1540,0	1438,9	1748,3	2492,6	2178,5	141,5

The margin difference of the index by administrative districts of the region equals 7.2 times: from 496.7 in Seredyna-Buda dt. to 3577.0 in Romny dt. At the same time, in 2016 in Nedryhailiv dt. and in 2017- 2018 in the Yampil dt, according to official statistical reports, ear diseases in adult population were not recorded at all.

The margin index difference by cities of the region is 2.7 times: from 1375.9 in Konotop to 3761.3 in Romny.

In the structure of level indexes of ear diseases, the main diseases in 2019 were middle ear and papilliform process diseases (32.7% with an indicator of 691.5), hearing loop (2.5% with an indicator of 52.0), chronic otitis of the middle ear (0.6% with an indicator of 11.9).

Further, the analysis of the morbidity rates of the adult population of the Sumy region by administrative territories for the period 2015-2019 throat disease was conducted. The obtained data are given in Table 2.

Analysis of the data given in Table 2 indicates that during the study period, the current morbidity rate in adult population of the region decreased by 17.9% and equaled to 167.7 per 100 thousand adult population.

By the rural administrative territories of the region, this index differs 42.1 times: from 13.5 in Lebedyn to 568.5 in Romny dt. At the same time, in the territory of 10 (55.6%) districts during the study, the increasing of morbidity with throat diseases in adults was recorded, and in the territory of 7 (38.9%) districts, on the contrary, the decreasing was recorded. The highest rate of increasing in the morbidity rate was recorded in Krasnopillia dt (335.5%), and the highest rate of decreasing was recorded in Lebedyn (77.3%) dt.

Among cities (towns) of the region, the margin difference the index varies in 15.6 times: from 18.0 in Lebedyn to 281.2 in Romny. At the same time, in the territory of 3 (42.9%) towns during the study period, an increasing of

Table 2. Sumy region throat diseases morbidity rate in adult population, 2015-2019 yrs. (per 100 thousand of adult population)

Administrative territory	years/rates (indexes)					2019 to 2015 yrs. %
	2015	2016	2017	2018	2019	
Sumy region	204,3	215,8	212,2	189,5	167,7	82,1
<i>Region districts</i>						
Bilopillia	313,9	318,6	321,0	283,5	238,6	76,0
Buryn	79,4	93,5	208,4	197,6	154,3	194,3
Velyka Pysarivka	17,9	-	16,0	40,3	50,2	280,4
Hlukhiv	270,7	246,1	192,9	196,4	209,1	77,4
Konotop	217,1	206,3	221,4	196,2	195,9	90,2
Krasnopillia	39,2	81,3	86,5	61,5	131,5	335,5
Krolevets	202,0	193,7	174,6	203,1	213,3	105,6
Lebedyn	59,5	182,0	7,9	32,4	13,5	22,7
Lypova Dolyna	81,3	53,7	116,2	104,5	96,7	118,9
Nedryhailiv	69,3	-	14,4	-	46,3	66,8
Okhtyrka	118,0	147,9	157,0	155,5	126,1	106,9
Putyvl'	288,3	176,7	208,4	171,3	484,7	168,1
Romny	306,4	418,9	549,9	607,8	568,5	185,5
Seredyna-Buda	-	31,9	168,7	117,5	51,2	-
Sumy	233,6	185,9	195,7	199,1	179,5	76,8
Trostianets	74,2	101,3	94,9	100,8	90,9	122,5
Shostka	223,5	177,6	240,9	133,9	99,9	44,7
Yampil	255,2	241,4	238,9	304,6	279,8	109,6
<i>Towns of the region</i>						
Sumy (city)	264,4	289,7	216,8	161,7	88,8	33,6
Hlukhiv (town)	341,9	312,3	211,4	224,1	287,1	118,7
Konotop (town)	230,2	239,1	250,9	116,5	237,0	103,0
Lebedyn (town)	106,9	195,7	9,4	31,2	19,2	18,0
Okhtyrka (town)	157,1	174,2	209,1	232,2	128,3	81,7
Romny (town)	370,7	562,2	714,8	811,5	1042,4	281,2
Shostka (town)	247,2	207,7	261,8	199,4	120,1	48,6

the index was recorded, and in the territory of 4 (57.1%) towns decreasing was registered.

In the structure of the morbidity rates in adult population the next throat diseases are leading: chronic glands and adenoid diseases – 45.6% with an index of 76.4; chronic pharyngitis – 43.9% with an index of 73.6; chronic laryngitis, laryngotracheitis – 10.6% with an index of 17.7 per 100 thousand adult population.

The next step of the study was to investigate and to analyze the morbidity rates in adult population of the Sumy region with nasal diseases in the dynamics of 2015-2019 yrs. by administrative territories of the region. The results obtained are presented in Table 3.

The analysis of the data given in Table 3 indicates that during the study period, the morbidity rate in adult population of the region during the study period decreased by 3.5% and equaled 122.1 per 100 thousand adult population. The margin

difference of the index by administrative rural areas varies by 144.7 times: from 2.7 in Lebedyn dt. to 390.7 in the Romny dt., and among town the index varies by 6.4 times: from 85.9 in Sumy to 553.4 in Romny, in the absence of data on recorded cases in adults of nasal diseases was registered in Lebedyn.

During the study period, the largest decreasing in the morbidity with nasal diseases in adults was recorded (25.4 times) in Lebedyn dt.; increasing was registered in Seredyna-Buda (7.7 times) district.

In the structure of disease prevalence level, the main lines are presented with vasomotor and allergic rhinitis (51.4% with an index of 62.7); chronic rhinitis, nasopharyngitis (40.1% with an index 49.0); chronic sinusitis (8.5% with an index of 10.4).

The second phase of the study investigated and analyzed prevalence rates of ear, throat and nose diseases (ENT) in adult population of Sumy region.

Table 3. Sumy region nasal diseases morbidity rate in adult population, 2015-2019 yrs. (per 100 thousand of adult population)

Administrative territory	years/rates (indexes)					2019 to 2015 yrs.
	2015	2016	2017	2018	2019	%
Sumy region	118,0	128,1	138,1	132,6	122,1	103,5
<i>Region districts</i>						
Bilopillia	146,3	151,8	150,1	139,9	98,3	67,2
Buryn	40,6	43,0	137,0	130,2	51,0	125,6
Velyka Pysarivka	17,9	18,2	21,1	41,6	33,4	186,6
Hlukhiv	144,7	132,7	109,5	81,8	135,1	93,6
Konotop	89,2	105,4	141,4	131,6	108,0	121,1
Krasnopillia	36,0	59,7	66,8	55,3	50,7	140,8
Krolevets	20,1	37,3	66,9	109,4	106,4	+5,3 p.
Lebedyn	68,5	135,2	15,7	4,8	2,7	0,4
Lypova Dolyna	50,7	83,7	130,1	80,0	110,4	219,0
Nedryhailiv	33,7	23,6	34,4	14,6	27,3	81,0
Okhtyrka	150,3	180,3	180,8	192,8	190,6	126,8
Putyvl'	175,5	123,4	108,9	141,0	181,2	103,2
Romny	216,6	279,8	341,7	420,3	390,7	180,4
Seredyna-Buda	21,4	33,4	80,8	195,0	165,3	+7,7 p.
Sumy	102,7	101,0	114,0	120,4	120,4	117,2
Trostianets	88,1	67,5	99,6	78,7	42,0	47,7
Shostka	159,9	121,3	171,8	84,4	130,5	81,6
Yampil	152,4	103,5	144,3	154,4	156,3	102,6
<i>Towns of the region</i>						
Sumy (city)	172,6	162,0	146,0	133,6	85,9	49,8
Hlukhiv (town)	184,1	169,0	109,7	81,6	159,7	86,7
Konotop (town)	105,0	120,7	149,0	141,4	125,3	119,3
Lebedyn (town)	100,4	160,6	18,7	1,9	-	-
Okhtyrka (town)	214,7	251,3	254,0	273,1	274,4	127,8
Romny (town)	290,5	374,9	392,0	536,0	553,4	257,8
Shostka (town)	177,2	136,0	190,6	139,7	159,0	89,7

The results of the study of prevalence rates in adult population of the Sumy region by administrative territories for the period 2015-2019 of ear diseases are given in Table 4.

Analysis of the data given in Table 4 indicates that during the study period, the prevalence rate of ear diseases in adult population of the Sumy region decreased by 13.6% and equaled 2113.0 per 100 thousand. At the same time, in the territory of 13 (72.2%) administrative rural districts and 4 (57.1%) towns there was an increasing in this index. Among administrative rural areas, the prevalence rates of ear diseases in adult population varies in 7.2 times: from 496.7 in Seredyna-Buda to 3577.0 in Romny district. Among towns, a 2.5-fold variation of this index was recorded: from 1807.5 in Sumy to 4557.7 in Romny.

In the structure of the prevalence rate of ear diseases in adult population of the Sumy region, the following diseases occur the most: middle ear and papilliform process diseases

(32.7% with an indicator of 691.5); hearing loop (8.3% with an index of 176.2), chronic otitis of the middle ear (7.8% with an index of 164.9).

Further, the issue of prevalence rates of throat diseases in adult population of the Sumy region was studied and analyzed. The results of the study of these prevalence rates (throat diseases) by administrative territories for the period 2015-2019 are given in Table 5.

The analysis of the data given in Table 5 indicates that in the region during the study period, the prevalence rate of throat diseases in adult population decreased by 13.3% and amounted to 665.1 per 100 thousand people. By administrative territories of the region, this indicator has reliable differences. Thus, by administrative rural areas, the margin difference of the index varies in 3.8 times: from 310.0 in Velyka Pysarivka dt. to 1188.2 in Putyvl' district and 2.5 times among the towns of the region: from 553.5 Okhtyrka to 1375.2 in Romny.

Table 4. Sumy region ear diseases prevalence rate in adult population, 2015-2019 yrs. (per 100 thousand of adult population)

Administrative territory	years/rates					2019 to 2015 yrs. %
	2015	2016	2017	2018	2019	
Sumy region	2445,8	2577,8	2554,7	2289,7	2113,0	86,4
<i>Region districts</i>						
Bilopillia	2623,4	2687,0	2682,8	2563,5	2488,1	94,8
Buryn	3090,9	3534,5	3226,9	3103,1	3331,7	107,8
Velyka Pysarivka	889,3	782,1	1253,5	2072,2	2103,0	236,5
Hlukhiv	1835,0	1529,6	1310,9	1324,3	1365,8	74,4
Konotop	1921,3	2152,5	2048,1	1854,4	1736,5	90,4
Krasnopillia	1224,2	3897,8	1381,8	1428,4	1540,9	125,9
Krolevets	3950,8	3986,6	3842,2	3430,8	3407,2	86,2
Lebedyn	2136,5	2945,6	2398,1	2843,9	2320,6	108,6
Lypova Dolyna	2143,3	2322,8	2185,2	2058,8	2577,8	120,3
Nedryhailiv	2161,9	377,8	426,9	572,4	635,6	29,4
Okhtyrka	1894,4	2105,2	2183,3	2285,0	1961,4	103,5
Putyvl'	1583,7	1085,9	1595,3	1813,0	1968,1	124,3
Romny	2347,9	2501,2	2858,6	3412,4	3577,0	152,3
Seredyna-Buda	364,4	558,4	1342,5	2000,3	496,7	136,3
Sumy	2338,9	2352,9	2531,7	2510,3	2492,2	106,6
Trostianets	2046,7	2445,1	2587,6	2729,0	2814,5	137,5
Shostka	1821,4	1752,4	2227,5	2123,5	2230,4	122,5
Yampil	834,5	965,6	1293,9	1608,6	1541,2	184,7
<i>Towns of the region</i>						
Sumy (city)	3708,8	3755,0	3686,5	2369,8	1807,5	48,7
Hlukhiv (town)	2260,2	1909,0	1634,5	1841,3	1908,4	84,4
Konotop (town)	2078,1	2187,8	2172,3	2060,0	1968,9	94,7
Lebedyn (town)	2390,4	2410,1	2782,8	3835,7	2972,2	124,3
Okhtyrka (town)	2224,2	2738,4	2534,6	2760,4	2356,4	105,9
Romny (town)	2963,4	2787,2	3160,2	3204,9	4557,7	153,8
Shostka (town)	2017,6	1958,8	2483,4	3554,7	2750,0	136,3

During the study period, by administrative territories of the region, the index fluctuated both downward and upward. The largest level of decreasing was registered in Hlukhiv (34.3%), and the largest level of increasing was registered in Lebedyn (222.5%).

In the structure of the prevalence of throat diseases in adult population, the most typical are chronic glands and adenoid diseases (48.4% with an indicator of 322.1), chronic pharyngitis (34.9% with an indicator of 232.7), chronic laryngitis, laryngotracheitis (16.6% with an indicator of 110.4).

The next step of the study was to examine prevalence rates of nasal diseases in adults. The results of the study of prevalence rates of nasal diseases in adult population of the Sumy region by administrative territories for the period 2015-2019 are given in Table 6.

An analysis of the data in Table 6 indicates that the prevalence of nasal diseases in the adult population tends to

decrease in the area during the study period. The decreasing rate was 1.7% with an indicator of 389.9 per 100 thousand adult population of the region. Among administrative territories of the region, the margin difference of the indicator varies 3.4 times: from 190.9 in Konotop to 644.7 in Putyvl' district. Among towns, this indicator ranges from 337.6 in Konotop to 766.5 in Romny, which is 2.3 times. At the same time, the indicator increased in 16 (64.0%) of the administrative territories of the region, and in 9 (36.0%) of the administrative territories one registered a decreasing process.

In the structure of the prevalence rate of nasal diseases in adult population, vasomotor and allergic rhinitis (44.3% with an index of 172.9), chronic rhinitis, nasopharyngitis (39.8% with an index of 155.2), chronic sinusitis (15.9% with an index of 61.8) occupy the main lines.

The study obtained data on the morbidity rates in adult population of Sumy region with diseases of ear, throat

Table 5. Sumy region throat diseases prevalence rate in adult population, 2015-2019 yrs. (per 100 thousand of adult population)

Administrative territory	years/rates					2019 to 2015 yrs. %
	2015	2016	2017	2018	2019	
Sumy region	767,2	761,6	735,3	773,2	665,1	86,7
<i>Region districts</i>						
Bilopillia	528,9	539,3	545,5	494,1	472,6	89,4
Buryn	910,2	928,7	969,1	834,6	1038,1	114,1
Velyka Pysarivka	174,7	161,3	227,2	317,4	310,0	177,4
Hlukhiv	779,1	648,2	647,0	617,0	555,9	71,4
Konotop	987,5	900,1	855,3	744,2	795,5	80,6
Krasnopillia	311,6	370,9	383,3	429,4	437,7	140,5
Krolevets	904,7	906,3	868,2	839,3	814,9	90,1
Lebedyn	402,7	595,9	534,8	606,5	524,5	130,2
Lypova Dolyna	386,8	359,7	420,6	424,5	420,6	108,7
Nedryhailiv	910,7	657,4	670,6	794,6	853,4	93,7
Okhtyrka	558,2	600,6	596,3	516,3	512,1	91,7
Putyvl'	567,9	487,6	530,0	621,7	1188,2	209,2
Romny	1005,3	970,3	1099,0	1019,4	983,4	97,8
Seredyna-Buda	458,7	496,1	688,2	603,8	718,0	156,5
Sumy	735,8	747,3	754,4	738,4	765,3	104,0
Trostianets	665,0	794,3	753,0	880,5	700,5	105,3
Shostka	618,1	653,6	804,5	875,7	623,6	100,9
Yampil	612,3	678,0	448,9	637,4	455,2	74,3
<i>Towns of the region</i>						
Sumy (city)	977,6	959,9	786,5	977,8	661,1	67,6
Hlukhiv (town)	968,8	776,5	713,6	652,8	636,6	65,7
Konotop (town)	923,9	867,7	903,2	779,8	754,2	81,6
Lebedyn (town)	427,4	612,9	604,2	745,3	951,1	222,5
Okhtyrka (town)	665,1	660,3	696,6	608,2	553,5	83,2
Romny (town)	1350,0	1250,5	1350,7	1241,8	1375,2	101,9
Shostka (town)	689,8	923,5	902,2	1478,8	728,0	105,5

and nose (ENT) and main diseases in their structure and prevalence rates of these diseases in adult population of the region. These indicators were analyzed in the dynamics of 2015 -2019 years and by comparing the statistics of the administrative territories of the region. The data obtained indicate that in the dynamics of the study years, an increasing in the morbidity rates of ear diseases in adult population is recorded; the morbidity rates of nasal diseases also tend to increase. The remaining indicators, including the morbidity with throat diseases and the prevalence of ear, throat and nose diseases, are showing tendency to decrease.

Significant fluctuations in all the studied indexes among administrative territories of the region deserve high attention. According to some indicators, some differences vary for more than a hundred times. This situation is indicated by the authors who studied the morbidity rates and the prevalence of various diseases in adult population in other

regions of Ukraine [9,10]. The reason for current situation, which requires a special in-depth study, may be caused by different level of accessibility of the population from different administrative territories to certain types of specialized medical care and shortcomings in the organization of statistical records of the state of health of the population.

CONCLUSIONS

In the course of the study, the dynamics of indicators and levels of morbidity of ear, throat and nose diseases (ENT) in adult population of the Sumy region, as an agricultural region of the country, the dynamics and levels of this category diseases prevalence in adult population of the region were stated. The data of the analysis should be taken into account in the process of reforming the otolaryngological service in the region.

Table 6. Sumy region nasal diseases prevalence rate in adult population, 2015-2019 yrs. (per 100 thousand of adult population)

Administrative territory	years/rates					2019 to 2015 yrs. %
	2015	2016	2017	2018	2019	
Sumy region	396,6	392,6	393,9	408,4	389,9	98,3
<i>Region districts</i>						
Bilopillia	384,8	401,4	400,6	359,5	289,9	75,3
Buryn	420,4	458,7	338,6	430,3	429,9	102,2
Velyka Pysarivka	76,4	99,5	143,3	203,4	217,4	284,6
Hlukhiv	370,0	339,4	338,3	247,2	349,0	94,3
Konotop	323,3	338,2	358,4	337,6	190,9	59,1
Krasnopillia	198,6	233,4	316,7	272,2	280,8	141,4
Krolevets	360,9	372,3	392,0	385,5	338,4	93,8
Lebedyn	284,7	412,1	353,1	438,0	391,9	137,6
Lypova Dolyna	253,8	308,4	343,6	283,0	327,8	129,2
Nedryhailiv	365,1	300,5	330,1	332,8	378,1	103,6
Okhtyrka	382,1	437,9	415,8	411,7	389,4	101,9
Putyvl'	413,6	423,4	399,2	452,7	644,7	155,9
Romny	543,5	496,0	522,2	604,8	580,8	106,9
Seredyna-Buda	177,2	214,6	287,6	325,7	328,2	185,2
Sumy	230,6	385,3	383,2	382,6	397,1	172,2
Trostianets	255,5	252,6	271,1	278,8	216,1	93,7
Shostka	420,6	402,8	516,8	516,8	493,2	117,3
Yampil	320,0	301,0	293,3	303,2	346,2	108,2
<i>Towns of the region</i>						
Sumy (city)	494,2	460,5	376,8	433,6	379,4	76,8
Hlukhiv (town)	477,2	419,8	404,8	231,5	432,9	90,7
Konotop (town)	344,4	349,3	383,6	352,2	337,6	98,0
Lebedyn (town)	346,3	459,8	424,6	618,4	544,6	157,3
Okhtyrka (town)	475,5	530,1	510,9	477,9	453,6	95,4
Romny (town)	730,8	601,5	674,3	704,7	766,5	104,9
Shostka (town)	464,3	333,6	542,3	829,2	519,4	118,9

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The Authors declare no conflict of interest.

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