

WHAT DETERMINES REGIONAL DIFFERENCES IN OUTPATIENT ANTIMICROBIAL CONSUMPTION IN RUSSIAN FEDERATION?

POSTER #P775

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Abstract #1086

What determines regional differences in outpatient antimicrobial consumption in Russian Federation?

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Objectives

We aimed our study to compare outpatient antimicrobial consumption (AC) in different regions of Russian Federation (RF) and investigate socio-economic determinants of AC.

Methods

AC data in ATC class J01 were obtained by RGC in 2004-2006 during pharmacy audit in 11 regions of RF and expressed as number of DDD per 1000 inhabitants per day (DID) (ATC-DDD Index, 2007). Demography and socioeconomic indices: population, population density (v2), urban sector weight, men/women ratio, age structure, natural increase and marriage (v9) rates, economically active population weight, economic activity level, unemployment rate, average per capita population monetary income (v13), average monthly nominal accrued salary for working in economics (v14), average rate of monthly pension assigned (v15), pensioners quantity, population with monetary incomes lower living-wage weight (v17), medical institutions quantity, hospital beds quantity (v19), hospital beds quantity/1000 inhabitants (inh), number of inh/hospital bed, out-patients' clinics visits/day (v22), out-patients' clinics visits/day/10000 inh, physicians quantity (v24), physicians quantity/10000 inh, number of inh/physician, nurses quantity, nurses quantity/10000 inh, number of inh/nurse, morbidity, some infectious and parasitic diseases morbidity, retailment turnover, retailment turnover per capita, gross regional product per capita were taken from RF Federal agency of state statistics report. To assess correlation of variables multiple regression analysis (MLR) was performed using SAS (program package SAS Institute, USA, version 8.02 for Windows XP).

Results

AC in 11 regions of RF in 2004-2006 is presented in Table.

After MLR carrying out we defined dependence model: $DID = 93,905 - 0,15*v2 - 3,8311*v9 - 9,3132*\ln(v13) - 11,1692*\ln(v14) + 0,0154*v15 - 0,3549*v17 - 0,6319*v19 - 0,1126*v22 + 48,0576*\ln(v24)$ ($R^2=0,849$, adjusted $R^2=0,789$).

Conclusion

Regions differed significantly in level of AC in study period. Some variables - v15 and v24 exerted positive influence on AC, some - v2, v9, v13, v14, v17, v19 and v22 – negative one.

Table. Antimicrobial consumption in 11 regions of Russian Federation in 2004-2006.

Region	AC (DID)		
	2004	2005	2006
Voronezhskaya oblast	11.08	12.9	12.23
Krasnodarskii kray	8.62	7.08	6.08
Krasnoyarskii kray	7.16	9.59	9.62
Nizhegorodskaya oblast	8.09	8.59	8.37
Novosibirskaya oblast	10.04	12.24	12.43
Omskaya oblast	6.40	7.29	7.26
Bashkortostan	9.74	11.06	11.88
Tatarstan	8.92	9.92	10.45
Rostovskaya oblast	4.94	7.12	6.93
Samarskaya oblast	8.55	7.76	8.38
Sverdlovskaya oblast	7.94	7.38	7.19

BACKGROUND

Antimicrobial consumption level depends on many factors described in foreign studies: demographic, cultural, socio-economic indices etc. [1-3].

Taking into consideration big population, regions territorial remoteness, distinct antimicrobials usage practice, different morbidity indices, huge number of pharmaceutical companies and lack of efficient regulation of their activities it is therefore essential to conduct such studies in Russian Federation.

OBJECTIVES

To compare outpatient antimicrobial consumption in different regions of Russian Federation in 2004-2006 and investigate socio-economic determinants of antimicrobial consumption.

METHODS

Antibiotic consumption data

Data containing generic names, drug formulations, dosages and number of packages of systemic antimicrobials were collected during retail audit of drugs in Russian Federation by marketing-research company in 11 regions of Russian Federation in 2004-2006. It was based on pharmacy sales of antimicrobials [4].

The retail audit consisted of forming a panel of pharmacies for each region. The panel represented the total pharmacy network, i.e. all types of pharmacies were included. In addition, the number of retail outlets was sufficient to avoid random mistakes.

Outpatient consumption of antimicrobials was expressed as the number of defined daily doses (DDD) per 1000 inhabitants per day (DID) (WHO, version 2007) [5].

Demography and socioeconomic indices

Population, population density (v2), urban sector weight, men/women ratio, age structure, natural increase and marriage (v9) rates, economically active population weight, economic activity level, unemployment rate, average per capita population monetary income (v13), average monthly nominal accrued salary for working in economics (v14), average rate of monthly pension assigned (v15), pensioners quantity, population with monetary incomes lower living-wage weight (v17), medical institutions quantity, hospital beds quantity (v19), hospital beds quantity/1000 inhabitants (inh), number of inh/hospital bed, out-patients' clinics visits/day (v22), out-patients' clinics visits/day/10000 inh, physicians quantity (v24), physicians quantity/10000 inh, number of inh/physician, nurses quantity, nurses quantity/10000 inh, number of inh/nurse, morbidity, some infectious and parasitic diseases morbidity, retailment turnover, retailment turnover per capita, gross regional product per capita were taken from Russian Federation Federal agency of state statistics report [6, 7].

Influence of variables on outpatient antimicrobial consumption

To assess correlation of variables multiple regression analysis (MLR) was performed using SAS (program package SAS Institute, USA, version 8.02 for Windows XP) [8].

RESULTS

Outpatient consumption of antimicrobials in 11 regions in 2004-2006 is represented in Figure. Antimicrobial consumption level varied from 4.94 DID to 11.08 DID (in average – 8.32 DID) in 2004, in 2005 – from 7.08 DID to 12.90 DID (in average - 9.17 DID) and in 2006 – from 6.09 DID to 12.44 DID (in average 9.18 DID) (see Figure).

Within regions the highest levels of outpatient antimicrobials consumption were registered in Voronezhskaya oblast in 2004-2005 and in 2006 in Novosibirskaya oblast (see Figure).

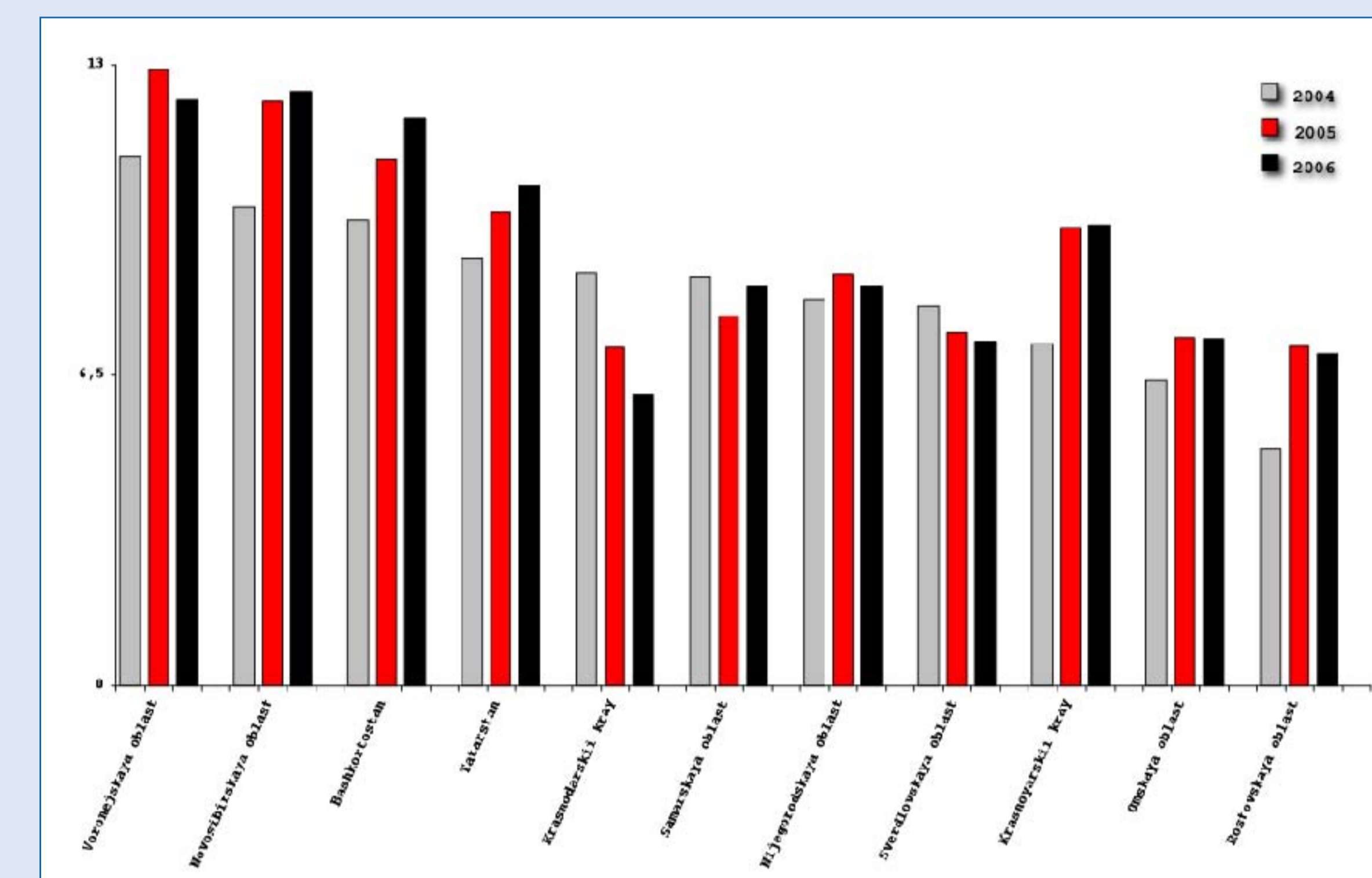


Figure. Outpatient antimicrobials consumption in 11 regions of Russian Federation in 2004-2006 (DID).

After MLR carrying out the following dependence between outpatient antimicrobial consumption and demography/socioeconomic indices was observed ($R^2=0,849$, adjusted $R^2=0,789$):

$DID = 93,905 - 0,15*v2 - 3,8311*v9 - 9,3132*\ln(v13) - 11,1692*\ln(v14) + 0,0154*v15 - 0,3549*v17 - 0,6319*v19 - 0,1126*v22 + 48,0576*\ln(v24)$.

Hence 9 variables out of 34 were significantly associated with outpatient antimicrobial consumption (see Table).

Table. Indices associated with outpatient antimicrobials consumption.

Index	Coefficient	Standard error	Pr> t
Population density	1-0.1500	0.0222	< 0.0001
Marriage rate	-3.8311	0.7603	< 0.0001
Average per capita population monetary income (natural logarithm)	-9.3132	3.3170	0.0100
Average monthly nominal accrued salary for working in economics (natural logarithm)	-11.1691	2.9172	0.0009
Average rate of monthly pension assigned	0.0154	0.0017	< 0.0001
Population with monetary incomes lower living-wage weight	-0.3549	0.8889	0.0006
Hospital beds quantity	-0.6319	0.0737	< 0.0001
Out-patients' clinics visits/day	-0.1126	0.03182	0.0018
Physicians quantity (natural logarithm)	48.0576	5.2463	< 0.0001

CONCLUSIONS

1. Russian Federation regions significantly differed in levels of outpatient antimicrobial consumption.

2. Average rate of monthly pension assigned and physicians quantity exerted positive influence on antimicrobial consumption, some variables – population density, marriage rate, average per capita population monetary income, average monthly nominal accrued salary for working in economics, population with monetary incomes lower living-wage weight, medical institutions quantity, hospital beds quantity, out-patients' clinics visits/day – negative one.

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