

MONITORING OF COMMUNICABLE DISEASES IN THE NIŠAVA AND TOPLICA DISTRICTS DURING THE PERIOD FROM 2009 TO 2013

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Tracking the trend of communicable diseases represents an organized gathering of information regarding the trend of infectious diseases that may pose a potential risk to public health. Monitoring of communicable diseases is regulated by the Infectious Disease Law. The aim of our study was to analyze morbidity from infectious diseases in the Nišava and Toplica districts and the state of immunization during the period from 2009 to 2013. Operational records on infectious diseases in the Nišava and Toplica district were done by the Center for Prevention and Disease Control within the Public Health Institute Niš. A statistically significant increase in mortality from infectious diseases was observed during the studied period ($\chi^2=62.08$, $p < 0.001$). The rate of the overall morbidity from infectious diseases varied during the period, but the trend of significant changes has not been confirmed. The dominant position in the structure of overall morbidity from infectious and parasitic diseases belongs to droplet infectious diseases. Reports on performed revaccinations against measles, mumps and rubella indicate that weak coverage was present in 2012 (88.9%) and 2013 (86.1%). *Staphylococcus aureus* (*Staph. aureus*), Methicillin-resistant *Staphylococcus aureus* (MRSA) (20.1%) and *Acinetobacter* species (*Acinetobacter* spp) (15.6%) are recognized as the most common cause of nosocomial infections. Based on all of the above, the epidemiological situation in the Nišava and Toplica districts can be assessed as unsafe. *Acta Medica Medianae* 2015;54(4):12-17.

Key words: *infectious diseases, Nišava district, Toplica district, five-year analysis*

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Introduction

The health status of the population is the basis for the objective identification of priorities, as well as for stimulating and revising the objectives of health policy through the strategy of technology in health care. Health has multidimensional characteristics, it is very difficult to define and even harder to measure. The World Health Organization (WHO) defines health as "a state of

complete physical, mental and social wellbeing and not merely the absence of disease or infirmity" (1). We can say that this definition is idealistic, but it faithfully reflects the tendency of people and nations towards health. According to one of the recent definitions "health status is the description and/or measurement of the health of individuals, groups or the entire population according to accepted standards with the help of health indicators" (2).

Monitoring is a continuous systematic gathering, analysis and interpretation of data relating to specific diseases, which are used for planning, implementation and evaluation of health policies and health practice. Infectious disease control has two main objectives: early warning of potential threats to population health and monitoring of the implementation of programs for protection against infectious diseases (2). Infectious disease control is fundamental to population health at national, regional and global levels. All World Health Organization members are obliged to establish national systems for communicable diseases surveillance, which include:

- Risk assessment for infectious diseases, in order to identify the major threats to public health;

- Prioritization of threats to public health, in order to limit the monitoring to those that are really important;
- Assessment of the existing system, in order to discuss its strengths, weaknesses and opportunities for improvement;
- Development of a strategic action plan based on the findings of the evaluation;
- Implementation of activities planned for strengthening the system;
- Monitoring of the progress of implemented activities and evaluation of monitoring system performance;
- Evaluation of outcomes and overall impact of the monitoring system.

In the Republic of Serbia the monitoring of communicable diseases is regulated by the Infectious Disease Law (3). Protection of the population from infectious diseases involves the application of measures established by international sanitary conventions and ratified by international treaties.

The aim of our study was to analyze morbidity from infectious diseases in the Nišava and Toplica districts, as well as the state of immunization during the period from 2009 to 2013.

Data analysis

Databases on infectious diseases and immunoprophylaxis for the period from 2009 to 2013 were obtained from the Center for Prevention and Disease Control within the Institute of Public Health Niš, which keeps operational records on infectious diseases in Nišava and Toplica districts.

The rates of morbidity and mortality from infectious diseases were shown per 100.000 inhabitants. The rates were calculated relative to the number of inhabitants according to the 2011 census.

Results

Figure 1 shows the rates of illness. In 2009, 16561 cases of illness and 46 cases of death from infectious and parasitic diseases and conditions were reported. In 2010, there were 11374 cases of illness and 58 deaths. In 2011, 16682 cases of illness and 86 deaths were reported. In 2012, there were 11714 cases of illness and 107 deaths. In 2013, 13497 cases of illness and 108 deaths were reported (Figure 1). A statistically significant increase in mortality from infectious diseases was observed during the studied period ($\chi^2=62.08$, $p<0.001$) (Figure 2). Observing the rate of the overall morbidity from infectious diseases, we can conclude that it was 1.46 times lower in 2010 compared to 2009, in 2011 it was 1.47 times higher than in 2010, in 2012 1.93 times lower than in 2011, and in 2013 it was 1.26 times higher compared to the year of 2012.

In the Nišava and Toplica districts through the five-year period, the distribution of epidemics was the following: in 2013, 25 epidemics were re-

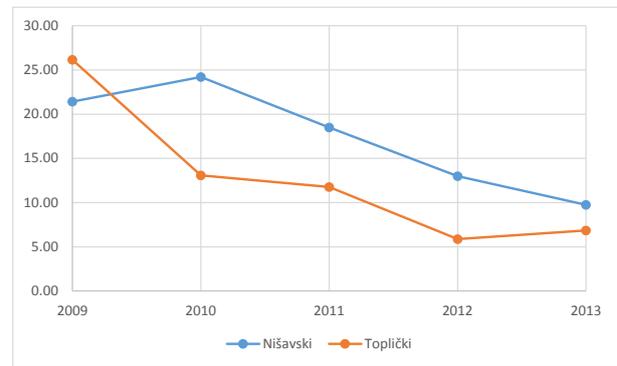


Figure 1. Mortality rates of infectious diseases in Nišava and Toplica district per 100.000 inhabitants during the period 2009-2013

Mortality rates of infectious diseases in Nišava and Toplica district per 100.000 inhabitants during the period 2009-2013

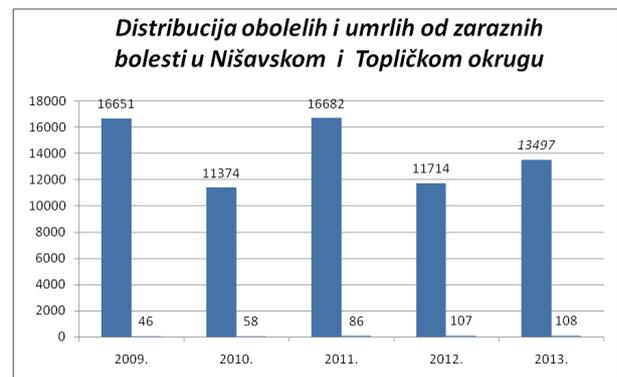


Figure 2. Distribution of morbidity and mortality from infectious diseases in Nišava and Toplica district

gistered in 416 patients; in 2012, 22 outbreaks of infectious diseases were registered in 602 patients; in 2011, 19 epidemics were registered in 10612 affected individuals and in 2010, 10 epidemics were registered in 68 diseased people. Out of the total number of outbreaks, most outbreaks were from intestinal diseases during the whole period of monitoring.

In the Nišava district, the dominant position in structure of the overall morbidity from infectious and parasitic diseases belongs to droplet infectious diseases (83.42% on average in the five-year period), among which the most numerous are streptococcal infection, during all five years of the follow-up. The second most frequent were infections caused by the influenza virus, and varicella (Table 1). In the Toplica district, the dominant position in the structure of the overall morbidity from infectious and parasitic diseases belongs to bacterial pneumonia, influenza virus, varicella virus, diarrhea and gastroenteritis (Table 2).

The total number of registered cases was 1.93 times lower than in 2011 (8652: 16682); in 2011 it was 2.04 times higher than in 2010

Table 1.: Eight mostly reported infectious diseases in Nišava district in the period from 2009 to 2013

Disease	2009		2010		2011		2012		2013		Ukupno	
	Num	Rate	Num	Rate								
Streptococcal infections	5071	1267.0	4013	1002.4	4694	1172.5	5287	1347.6	7325	1867.0	26390	1319.5
Influenza	3945	985.7	794	198.3	4135	1032.9	405	103.2	1389	354.0	10668	533.4
Varicella	1460	364.8	794	198.3	1689	421.9	1200	305.9	843	214.9	5986	299.3
Infectio intestinalis bacterialis	437	109.2	580	144.9	390	97.4	416	106.0	428	109.1	2251	112.6
Diarrhoea et gastroenteritis	450	112.4	412	102.9	352	87.9	418	106.5	359	91.5	1991	99.6
Pneumonia bacterialis	241	60.2	228	56.9	307	76.7	239	60.9	249	63.5	1264	63.2
Scabies	197	49.2	219	54.7	223	55.7	215	53.8	178	45.4	1032	51.6
Mononucleosis infectiva	160	40.0	188	46.9	200	50.0	168	42.0	157	40.0	873	43.7

Table 2.: Eight mostly reported infectious diseases in Toplica district in the period from 2009 to 2013

Disease	2009		2010		2011		2012		2013		Ukupno	
	Num	Rate	Num	Rate								
Pneumonia bacterialis	363	355.6	718	703.4	665	651.4	115	112.7	134	131.3	1995	1955.1
Varicella	323	316.4	474	464.5	544	632.9	453	443.9	115	112.7	1909	1870.8
Diarrhoea et gastroenteritis	321	314.7	381	373.4	334	327.2	354	346.9	297	291.1	1687	1653.3
Influenza	540	529.0	29	28.4	367	359.5	150	147.0	143	140.1	1229	1204.4
Pneumonia viralis non specificata	269	263.5	173	169.5	183	179.3	170	166.6	94	92.1	889	871.2
Scabies	102	99.9	74	72.5	61	59.8	100	98.0	95	93.1	432	423.4
Intoxicatio alimentaris bacterialis	103	100.9	75	73.5	67	65.6	68	66.6	58	56.8	371	363.6
Streptococcal infections	139	136.2	92	90.2	62	60.7	42	41.2	25	24.5	360	352.8

(16682:8197); and in 2010 it was 1.62 times lower than in 2009 (8197: 13317).

Immunophylaxis

The report on performed revaccination against measles, mumps and rubella in the Nišava district in the period from 2009 to 2013 shows weak coverage in 2012 (88.9%) and 2013 (86.1%). The lowest coverage during those years was recorded in the city of Niš - in 2012 (85.4%) and 2013 (84.3%). The report on performed revaccination against measles, mumps and rubella in the Toplica district in the period from 2009 to 2013 shows a satisfactory level of coverage throughout the period. Low coverage was recorded in 2011 in the municipality of Žitorađa (86.3%).

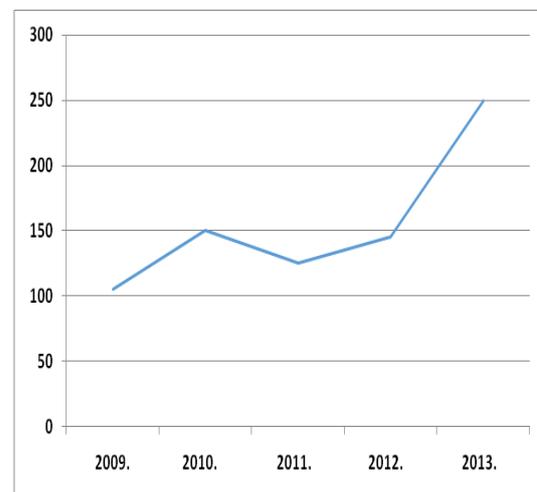
Nosocomial infections

In the five-year period, 793 nosocomial infections (NI) were reported by the health institutions of the Nišava district. The majority of patients had a single nosocomial infection, while a very small number of patients had two or more nosocomial infections. The sterility control of devices and other surgical materials was regularly performed. The most frequent localization of NI by systems were surgical site infections - 47.7%, infections of the respiratory system - 13.7%, infections of the digestive system 10.6% and urinary tract infections 6.45%. The highest number of nosocomial infections was reported at surgical clinics like the Neurosurgery Clinic, the General

Surgery Clinic and the Clinic of Orthopedics and Traumatology. The most common cause of nosocomial infections was Staph. aureus, MRSA (20.1%) and Acinetobacter spp. (15.6%), Klebsiella ESBL + Klebsiella sp. (12.1%), followed by Clostridium difficile (10.6%) and Pseudomonas (7.11%). In terms of resistance, most of the isolated breeds of MRSA, Acinetobacterspp, and Klebsiella sp. showed drug resistance.

Discussion

Tracking the trend of communicable diseases represents an organized gathering of informa-

**Figure 3.** The number of nosocomial infections in the period between 2009-2013

tion regarding the trend of infectious diseases that could pose a potential risk to public health. Infectious disease control is regulated by the Infectious Disease Law (3). In Serbia, epidemic notification and detection of potential threats, as well as making reports on infectious diseases and diseases of unknown origin that may pose a potential threat present the constituent activities of the budget financed program. Epidemic notification is a weekly obligation, if otherwise not defined, in the health system of the Republic of Serbia through the network of institutes and departments of public health. The reporting is done by health institutions, other entities performing health activities in accordance with the law, private practitioners and health care professionals on a prescribed form. Epidemiological monitoring is coordinated and implemented by the institutes and departments of public health, in collaboration with health care institutions and other institutions engaged in health care. The Infectious Disease Law obliges mandatory reporting on: outbreaks of communicable diseases; disease or death by an infectious disease; suspicion of cholera, plague, smallpox, yellow fever, viral hemorrhagic fevers, SARS, poliomyelitis, diphtheria, measles and botulism infection, as well as the appearance of an unknown infectious disease; the secretion of abdominal typhoid, paratyphoid, other salmonella, shigella, yersinia and campylobacter agents as well as carriers of antigens of viral hepatitis B, viral hepatitis C and HIV antibody and carriers of the parasites that cause malaria; infections associated with health services (nosocomial infections); laboratory identified infectious disease agents and a suspected use of biological agents (4, 5).

Health indicators or indicators

Health indicators are the main instrument by which the state of population health is evaluated. An ideal health indicator (valid, objective, sensitive and specific) does not exist, regardless of the efforts made in the search for objective health standards through the centuries. In recent decades, the approach to measuring the health status of the population has changed from the "negative" (focused on the disease) to "positive" aspect of health which is based on the perception of health, functioning and capabilities to adapt to the environment (6). This approach means that the life style and quality of life indicators should be used for the assessment (7).

Principles of keeping records in the health care system

Record-keeping is an integral part of medical work and it serves for upgrading the population health care and its better planning and programming. It provides information for health institutions, Health Insurance Fund, the Ministry of Health and all other interested organizations and individuals. The recorded data must be current,

comprehensive and adapted for health research. The data is recorded by the territorial principle – municipality, district, Republic (8).

Preparation and submission of reports

Based on the managed records, health care institutions make up quarterly reports and submit them to the district institute or the department of public health; institute/department of public health puts together municipal and district bi-annual reports and submits them to the Institute of Public Health of Serbia; the Institute of Public Health of Serbia aggregates annual reports and then sends them to the Ministry of Health.

The number of patients with infectious diseases on the territory of the Nišava and Toplica district in 2013 was higher than in 2012 (13497 11714), with a peak in 2011 (16,682) and the number of deaths steadily increases from 2009 to 2013. The number of reported cases is higher on the account of diseases that are reported collectively: influenza, streptococcal pharyngitis and tonsillitis. The reports on epidemics are declining because of fewer family epidemics reports (9).

Clinicians write the code J18 for pneumonia which does not subject to notification by the Rule book of notifiable infectious diseases, and they feel that these patients should not be reported. The same goes for diarrhea with code K. There is a problem in the reporting of deaths from infectious diseases where 2 diseases are written as a cause of death, or different information on the cause of death is written on the application and DEM 2 form. Collective reports of communicable disease exist only in the Health Center Niš and the HC Ražanj, where they also report an individual registration of illnesses that is reported collectively. Collective reports are specially sent from general practice, pediatrics and the department of dermatology and as such they are sent to the hygienic and epidemiological service (HES) of the HC Niš, as well as the individual registration of diseases that are reported collectively by other health care facilities. HES does not check through the HC departments whether patients have already been reported and there is a possibility of double recording of cases.

Based on all of the above, the epidemiological situation in the Nišava and Toplica districts can be assessed as unsafe.

Immunoprophylaxis of infectious diseases

A progressive reduction of the planned coverage of children is notable in the reporting period. One of the reasons is an incomplete and untimely distribution of vaccines until 2012. The situation improved in 2013, when the supply was improved, and the problem was solved by redistribution of vaccines between institutions. The existing anti-vaccination lobby, among pediatricians in good part, contributes to the reduced co-

verage. Misinformation being spread significantly affects the motivation of parents to vaccinate their children, as well as the lack of penalties for unscrupulous parents. It often happens that children are unreasonably not vaccinated because of false contraindications determined by pediatricians.

The new Regulation on vaccination came into force on 1st January 2015, and quinquivalent vaccine use at the expense of the Health Insurance Fund is only allowed for children born after 1st November 2014. All these reasons, both objective and subjective, contribute to reduced coverage. The situation can be remedied through affirmative programs and popularization of vaccination in the media. Also, better staff training in pediatric services is needed, as well as regular and timely distribution of vaccines. A contemporary approach with the use of new vaccines is necessary.

Conclusion

In order to reduce the number of cases of infectious diseases, it is necessary to amend the Law on Records (because in the present there is no summary reporting category). It is necessary to make a professional methodological instruction (valid for sanitary and health inspectors) for healthcare facilities and laboratories about who writes an individual, who writes a collective report and who writes reports on an isolated causer. It is also necessary to insist on regular reporting on communicable diseases (measures concerning the activities and responsibilities within the health care institutions, but also cooperation with health centers, hospitals and clinics, clinical centers). And what is really important is to introduce a unique electronic reporting system of patients and patient deaths for faster recording.

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Original article

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doi:10.5633/amm.2015.0402**NADZOR NAD ZARAZNIM BOLESTIMA U NIŠAVSKOM I TOPLIČKOM REGIONU U PERIODU OD 2009. do 2013. GODINE**

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Praćenje kretanja zaraznih bolesti predstavlja organizovano prikupljanje informacija u vezi sa kretanjem zaraznih bolesti koje mogu predstavljati potencijalni rizik za javno zdravlje. Nadzor nad zaraznim bolestima regulisan je Zakonom o zaraznim bolestima. Cilj našeg rada bio je da se analizira oboljevanje od zaraznih bolesti na području Nišavskog i Topličkog okruga kao i stanje imunizacije u periodu od 2009. do 2013. godine. Operativnu evidenciju zaraznih bolesti na području Nišavskog i Topličkog okruga radio je Centar za prevenciju i kontrolu bolesti Instituta za javno zdravlje u Nišu. Uočeno je statistički značajno povećanje smrtnosti od zaraznih bolesti tokom praćenog perioda ($\chi^2=62,08$, $p<0,001$). Stopa opšteg morbiditeta od zaraznih bolesti je u toku posmatranog perioda varirala, ali nije potvrđen trend značajne promene. U strukturi opšteg morbiditeta od zaraznih i parazitarnih bolesti dominantno mesto pripada kapljničnim zaraznim bolestima. Izveštaj o obavljenoj revakcinaciji protiv malih boginja, zaušaka i rubeole pokazuje da je slab obuhvat bio prisutan u 2012. (88,9%) i 2013. godini (86,1%). Kao uzročnici bolničkih infekcija najzastupljeniji su *Staphylococcus aureus* (*Staph. aureus*), Methicillin-resistant *Staphylococcus aureus* (MRSA) (20,1%) i *Acinetobacter species* (*Acinetobacter spp*) (15,6%). Na osnovu analize svega navedenog, epidemiološku situaciju u Nišavskom i Topličkom okrugu ocenjujemo kao nesigurnu. *Acta Medica Medianae 2015;54(4):12-17.*

Ključne reči: zarazne bolesti, Nišavski region, Toplički region, petogodišnja analiza

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