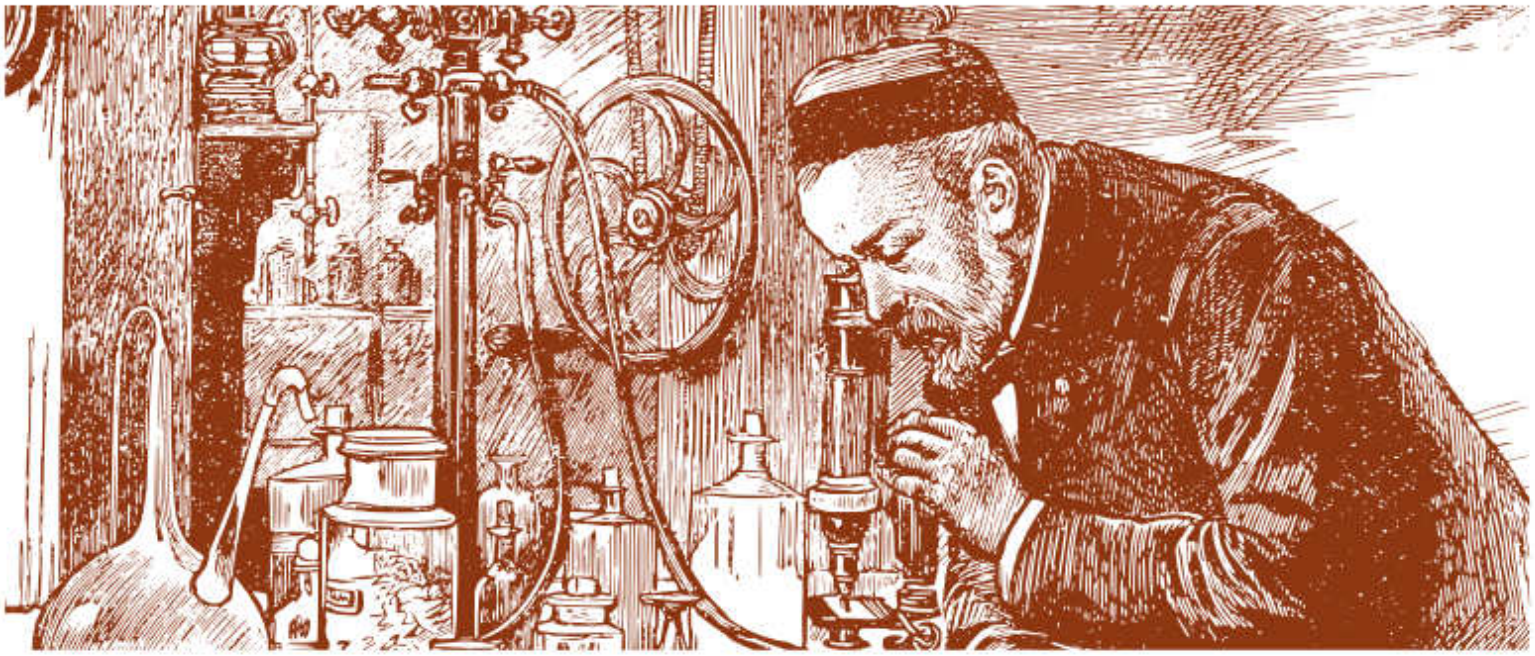
Days of Preventive Medicine
International Congress
49. Дани превентивне медицине - Међународни конгрес

22-25. 09. 2015.

Faculty of Medicine Niš, University of Niš
Медицински факултет у Нишу, Универзитет у Нишу

Public Health Institute Niš
Институт за јавно здравље Ниш



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49. DAYS OF PREVENTIVE MEDICINE
49. ДАНИ ПРЕВЕНТИВНЕ МЕДИЦИНЕ

INTERNATIONAL CONGRESS
МЕЂУНАРОДНИ КОНГРЕС

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2. Health promotion in vulnerable population
3. Environment and health
4. Nutrition and health
5. Theoretical and practical problems of communicable and non-communicable disease epidemiology
6. Microbiology today
7. Current parasitosis

ГЛАВНЕ ТЕМЕ

1. Актуелни приступ јачању система здравствене заштите
2.Промоција здравља код осетљивих категорија становништва
3. Животна средина и здравље
4. Исхрана и здравље
5. Теоријски и практични проблеми епидемиологије заразних и незаразних болести
6. Микробиологија данас
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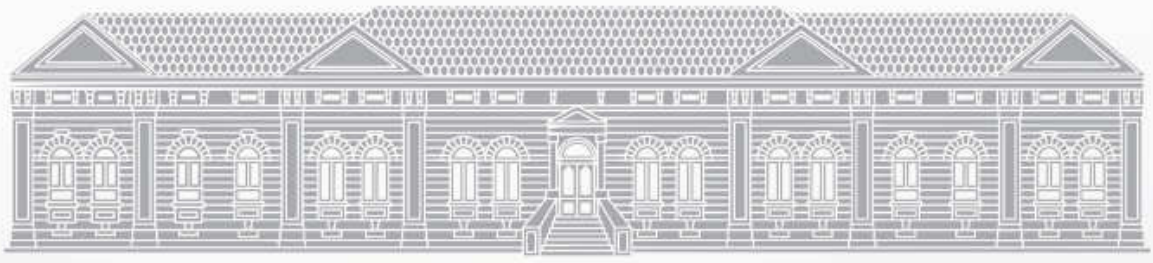

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The number of points assigned to the International Congress is:

invited lecturers:	**15 points**
oral presentation:	**13 points**
poster presentation:	**11 points**
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предавачи по позиву:	**15 бодова**
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постер презентације:	**11 бодова**
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49TH DAYS OF PREVENTIVE MEDICINE

BOOK OF PAPERS AND ABSTRACTS

22.-25. SEPTEMBER 2015.

NIŠ, SERBIA

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PUBLIC HEALTH CHALLENGES OF POPULATION MIGRATIONS ON GLOBAL AND LOCAL LEVELS- THREATS, RISKS AND CHALLENGES FOR PUBLIC HEALTH?

Dragan Ilić, Institute of Public Health Serbia „Dr Milan Jovanović Batut“

Migration, whether it is voluntary or forced, is becoming more common all over the world. People migrate in large numbers faster and further than ever before in history. This is happening at a time when many countries are not well prepared to deal with shifts in demographics, and when the politics and standpoints on migration and immigration are only now forming.

Migrants represent a vulnerable group for many reasons, especially because of the problems regarding the access to the health system, and because of discrimination, language, cultural barriers, legal status and other economic and social difficulties. Country’s unfavorable migration policy towards this group can have significant consequences on public health. Health implications of an unfavorable migration policy are numerous, and in many cases the percentage of the sick and the deceased in relation to the migration is continually rising.

From the public health point of view, this will have serious consequences for migrants/refugees, for their families that were left behind, but also for the communities to which the refugees came.

Of course, migrations are not a new phenomenon. During all the periods of the development of civilization people have been on the move, from nomadic shepherds all over the world who routinely move to this day, to the United States of America, Canada and Australia which were founded thanks to the immigrants.

Around 200 million people all over the world have the desire and the idea to cross the border every year. Migration became the integral and inevitable part of the global social and economic development. What is even more important is that the possibility of migration is becoming an increasingly significant part of the worldview of people who are living in growing poverty. In certain regions, people are encouraged to seek opportunities elsewhere, while politicians are simultaneously trying to stop the immigration with the excuse of or with the aim of protecting public health.

War, natural catastrophes, and complicated emergency situations are destroying the social and cultural infrastructure and are effecting more and more people than ever before, because as the world population rises and becomes more concentrated the number of people who are in danger and who are affected by these events is continually rising.

Despite the time and effort spent on resolutions and preventions of conflicts, in the last 15 years over 36 countries all over the world were involved in a certain type of conflict. These conflicts are collectively responsible for the deaths of over 60 million people. Many refugees will lose their citizenship and roof over their heads for years to come and, in some cases, only the future generations will be ble to hope for a better status.

What happens to the public health risks and the health risks of people in the migration process?

International border traffic has been connected to the spread of infectious diseases for a long time. The need to reach the highest levels of health protection while minimizing obstacles in migration of people and international trade of goods and services has become the leading principle which is regulated by the International Health Regulations (2005).

The connection between population migration, travel and the occurrence of diseases has historical roots, but it still affects the course of modern medicine. Traditional medical approaches which deal with migrants’ health have focused on recognizing and indentifying certain diseases, or the health issues in the migrant

population at the time and place of their arrival with the aim of protecting the native population by forming quarantines or centers where migrants would be isolated. Similar procedures are still used in the contemporary concept of immigration through medical screenings and the border patrol practices with the intention to decrease the public health threats or to mitigate the potential impact on health care services.

There are two approaches to the epidemiological analysis of diseases among migrants in the countries which accept migrants. The first approach is to analyze migrants' health and health risks during the migration process itself, and the second approach is to assess the development of health risks during the migrants' stay. The reference population for the first analytical approach is the regular population, the host country, while the reference group for the second approach can be the resident population but also the comparison cohorts in the place of migrants' origin.

Even in the cases of effective medical screenings on the border crossings, viral diseases with a shirt incubation period can remain unnoticed because the disease has not yet manifested itself clinically. While the quarantine principle is still in place, the International Health Regulations also recommend an urgent international report as well as an urgent response to the resulting situation which represents a public health threat.

Health indicators point to the fact that migrants in Europe are at a greater risk of numerous diseases than the resident population in those countries, that is, migrants fall ill more frequently than the native population especially from contagious diseases but also from chronic noncommunicable diseases and conditions.

Tuberculosis is the disease of the impoverished, and it is endemic in most of the developing countries where migrants come most often. The frequency of the new cases of tuberculosis infection in 15 counties of the EU has decreased in the last decades from 34.8 cases in 100,000 people in 1974, to less than 14 in 100,000 people. However, the number of new cases among migrants in Denmark has been increasing during the last 5 years; therefore the percentage of tuberculosis cases among the persons born abroad has risen from 18% in 1986 to over 60% in 1996. In the Netherlands, the frequency of tuberculosis cases among immigrants has risen from 45% to over 50%. The situation regarding tuberculosis is similar in Germany and France, and the number of people suffering from tuberculosis is three to six times higher among migrants. Almost the same can be said about the different types of hepatitis.

Out of 156,817 registered HIV positive persons in the countries of the EU 60,000 or even 38% are migrants.

Immigrants are also more exposed to other types of accidents. Research shows that in Germany immigrant children between the ages of five and nine have more traffic and other types of accidents.

Migrants in most European countries do not have the right to health insurance or they do not know either where or how to ask for help.

Migrants that come from countries with extreme poverty, those who were forcibly exiled due to war or dangerous environment, those with limited education or language barriers, and those who need the support of others (the elderly, children, persons with disabilities…) are at a greater risk of serious health disorders.

With regards to the movement of contagious diseases, the population mobility is one of the basic factors in their occurrence and a threat because it can cause reoccurrence of epidemics of international public health importance. Prevalence of inequality among the countries that migrants leave and the destination countries can also be of great importance for the noncommunicable diseases. Also, the migrants who have been most often exposed to legal, social and economic isolation can have worse health indicators that can significantly differ from those that can be found with the local population.

These and many other pieces of evidence clearly suggest that medical interventions and the attempts of mitigating negative medical outcomes in migrant communities can justify an approach different from the one used in local communities that accepted migrants.

The effect of migrations on the epidemiological view of communicable diseases and health in general

Despite the present perception of connection between migrations and introduction of communicable diseases, there is no direct connection between the two. Communicable diseases are connected primarily with poverty. Migrants often come from communities stricken with war, conflict or economic crises, after an exhausting travel which increases the risk of diseases occurring, especially communicable diseases like small pox and food borne infections caused by consuming inadequately hygienically treated food and water. European region has years of experience with certain communicable diseases like tuberculoses (TB), HIV/AIDS, hepatitis, small pox and measles. In the last decades, the burden of these diseases has been significantly lifted due to economic development, better living conditions, clean drinking water, adequately treated waste water as well as the effective health care system, vaccination, and rational use of antibiotics. These diseases, however, are not eliminated but still exist in the European region apart from migrations. This is also the case with vector-borne diseases in the Mediterranean, like leishmaniasis with a recent occurrence in Syria. Leishmaniasis is not transmitted from person to person and can be successfully treated. The risk of bringing exotic and rare infective agents to Europe, like Ebola, Marburg, LASSA virus or Middle East respiratory syndrome (MERS) is extremely low. Experience has shown that the risk of bringing in these diseases through migrants is not at all higher than when it comes to the importation of these diseases through regular passengers, tourists or health care workers. The frequency of tuberculosis in the countries of origin varies from 17 new cases in 100,000 people in Syria to 338 in 100,000 people in Nigeria. The average rate of TB in European region is 39 cases in 100,000 people. TB is not an easily transmitted disease. TB is rarely transmitted from migrants onto domicile population because of their limited contact.

HIV infection and viral hepatitis infections

Prevalence of HIV infection is generally low among the people of Middle East and North Africa. Therefore, there is a small risk that HIV will be transmitted to Europe through the migrants from these countries. Respiratory diseases in refugees do not represent higher risks of respiratory infections for the resident population because those are the common infections that widely circulates in the host country. However, physical and mental stress, shortage of housing, uncertain supplies of food and water, increase the risk of respiratory infections in refugees, which can be especially dangerous when certain groups are involved (pregnant women, newborns, children younger than five, people with chronic diseases, the elderly). Starting with September 2012, there were 15 laboratory-confirmed cases of MERS corona virus infection (CoV), including 7 fatalities which are connected to the MERS virus and which were reported by WHO in 8 countries in the European region. Most of the cases of infection were imported and did not cause further spread of the virus. The risk that the other passengers infected with the MERS-CoV will come to the European region is still low. Even though the risk of a bigger MERS epidemic in countries in the European Union is considered small, recent epidemic in the Republic of Korea shows that this possibility cannot be excluded.

Vector-borne diseases

The risk of the occurrence of vector-borne diseases like malaria and leishmaniasis can be increased due to a massive influx of refugees, as we can see in the case of the recent reoccurrence of malaria in Greece which is directly connected to the influx of migrants from Pakistan. This experience implies that there is a constant danger of reoccurrence of these infections and that there is a need of further supervision. At this moment, two countries in the WHO region, Tajikistan and Turkey, are at great risk of malaria reoccurrence due to the importation from Afghanistan and Syria.

Food borne and water borne diseases

The risk of food borne and water borne diseases is increasing in the migrants' poor living conditions. They usually get sick during the trip. The living conditions can lead to problems with keeping food and water in unhygienic conditions. Diarrhea is the most common symptom and it can be accompanied by nausea, vomiting or fever. Examples of such diseases are salmonellosis, shigellosis, campylobacteriosis and hepatitis A. Babies and small children, pregnant women, the elderly and persons with immunodeficiency disorders, especially those with HIV/AIDS, are especially prone to these diseases. On border crossings, there is usually no clean drinking water, toilets or showers. Waste disposal bins and regular waste disposal at the reception centers are insufficient, which represents further health threats for migrants.

With regards to chronic noncommunicable diseases and conditions, programmes which are implemented in developed countries among the residents and are focused on early detection and treatment of malignant diseases (cervical, breast and colon cancer) as well as on the improvement of health of mothers and children, have led to positive effects and decreased the prevalence of these diseases and fatalities caused by them. The presence of a large number of migrants from undeveloped and impoverished countries will significantly affect the epidemiology and prevalence of these diseases in the host environment.

Refugees' and migrants' health issues are similar to those of the resident population, though some diseases can be more frequent among migrants. The most common migrants' problems, including the accidental injuries, are: cardiovascular problems, problems regarding pregnancies, problematic deliveries, diabetes and hypertension.

Female migrants are often faced with specific challenges, especially mothers, as well as newborns and children.

The crucial issue regarding the noncommunicable diseases is the discontinuation of supervision over the chronic noncommunicable diseases due to nonexistent access to a health care service provider and health care services in general. Exile leads to discontinuation of a treatment crucial for chronic diseases. Disadvantaged children are susceptible to acute infections like respiratory infections and diarrhea due to poor living conditions and they require access to acute care. Insufficient hygienic conditions can lead to skin infections.

Situation in Serbia

Serbia is a signatory state of the United Nations Convention on the status of refugees from 1951 and the accompanying Protocol from 1967, and the right to asylum is guaranteed by the Constitution of Serbia. With the aim of strengthening that prerogative, Asylum Act was adopted in November 2007. Enforcing the act starting with April 1, 2008, Serbia accepted the full responsibility of determining the status of refugees.

In Serbia, there are 100,000 registered persons who expressed the intention to seek asylum in 2015. In the last couple of years, beside adults who are taken care of at the registered Asylum centers in Bogovadja near Valjevo, in Koviljaca Spa, in Sjenicaa in Krnjaca, among the asylum seekers there are minors. Their temporary care, until they are referred to the Asylum centre, is organized at the Institute for Children and Youth, Center for accommodation of persons without parental care in Belgrade and Nis.

In the last few months, there is a record of a sudden increase of persons who come to Serbia from neighboring countries and want to leave in the shortest time period possible, in a couple of days, and go to Hungary in order to more easily enter the EU.

A situation like this makes it more difficult to establish a regular system of migrants' health supervision and therefore increases health threat and threatens a possible occurrence of certain contagious diseases carried by

the persons who are migrating from places where there are diseases that have been eliminated in Serbia a long time ago.

According to Article 40 of the Asylum Act ("Sl.gl.RS", no.109/2007), it is regulated that "a person seeking asylum and a person with an approved asylum in the Republic of Serbia shall have equal rights to health care, in concordance with the regulations stipulating the health care of foreigners." The right to health care have the persons who have signed up and registered in the Ministry of Interior and therefore they have access to all the levels of health care.

Another separate group is made of illegal immigrants who are not accommodated nor registered at the Asylum centre and who stay outdoors in the areas around the borders, near Subotica, Kanjiza, as well as near the Macedonian border on the south, and who want to leave Serbia as soon as possible.

Considering the obligation to provide health care to the aforementioned categories of migrants, as well as the fact that this vulnerable population can represent a potential risk to the public health of people in Serbia when communicable diseases are in question, what is necessary is intense collaboration of all institutions that are involved in the registering, accommodating and implementing health supervision over immigrants, with the aim of better health care inclusion. The basic component of this collaboration is the continuous exchange of information on all levels.

In Serbia, **Health Supervision over the migrants on the territory of the Republic of Serbia Protocol** was established. The aims of establishing this protocol are:

1. **Establishing an efficient system of supervision** and identification of the risks of contagious diseases, which encompasses the collecting of data, analysis and reports through simple forms for all health care providers to fill, using which they can report the number and type of provided health care services but also the hygienic living and traveling conditions of the asylum seekers, as well as the suspicion of or actual occurrence of a contagious disease.

2. **Implementing preventive measures** which include risk identification, activities regarding the promotion of health, education and vaccination, first of all of those who work on taking care of migrants (health care workers, police, red cross, utility workers…), and providing the adequate conditions for temporary stay of refugees.

3. **Implementing control measures** through overviewing the circumstances of transmitting communicable diseases, researching individual cases of certain diseases and the epidemics of those diseases, implementing measures for combating and preventing them, supervision over the imported diseases.
In the existing conditions of current migration, inadequate hygienic conditions of accepting, accommodating and transporting of refugees represent the biggest risk to health and the biggest threat of communicable disease occurrence.

4. **Providing migrants with direct health care services** especially those with acute diseases, chronic patients as well as taking care of injuries which are common in migrants.

5. **Especially critical are children and youth** who make up nearly 30% of the total number of refugees and who need special support. The most disadvantaged are babies whose mothers cannot breastfeed them and who need to be provided with special food packages.

Crucial institutions that bear responsibility for carrying out the activities on Protocol implementation:

• Ministry of Health
• Institute of Public Health of Serbia with a network of institutes of public health
• Health care facilities (health care centers, inpatient medical institutions, pharmacies, laboratories)
• Commissariat for Refugees and Migration of the Republic of Serbia
• The Ministry of Interior, the Asylum Office
• The Ministry of Labor and Social Politics
• Red Cross of Serbia
• UN agencies and International Humanitarian Organizations (the Danish Refugee Council, UNHCR)
• Social institutions for the care of minors
• The institutions at the local level

Legislation in Serbia

-Asylum Act ("Sl.gl. RS", no. 109/2007)
-Regulations on medical examinations of asylum seekers when entering the Asylum Centre ("Sl.gl. RS", no. 93/2008)
-Regulations on housing conditions and ensuring basic living conditions at the Asylum Centre ("Sl.gl.RS" No.31 / 2008)
-Regulations on keeping and the content of records of persons accommodated at the Asylum Centre ("sl.gl.RS" No.31 / 2008)
-Health Care Act ("Sl.gl. RS" No.107 / 2005)
-Protection of Population from Infectious Diseases Act ("Sl.gl.RS" no. 125/2004)
-Regulations on reporting contagious diseases and other cases stipulated by the Protection of Population from Infectious Diseases Act ("Sl.gl. RS" No. 98/2005)

Establishing an effective system of public health supervision and identification of the risk of communicable diseases encompasses:

Collecting of data, continuous influx of data from the entry points and from the Asylum Centre. The Bureau for Public Health collects and analyses the data and sends it on a weekly basis to the Institute for Public Health of Serbia.
Analysis of the data, done by an expert team of the bureau/institute for public health that has the territorial jurisdiction, encompasses the assessment of the risk of an occurrence or transmittance of an already present contagious disease, based on the results of the obligatory health care examinations in accordance with the Regulations.
Reports- Collected and analyzed data, with suggestion of measures, authorized bureau/institute submits to the Institute for Public Health of Serbia, Sanitary Inspection of the Ministry of Health, the Health Center and the Collective Center.

Implementing preventive measures

Providing of the adequate accommodation conditions and transportation in accordance with the Regulations on housing conditions and ensuring basic living conditions at the Asylum Centre ("Sl.gl.RS" No.31 / 2008) with Government as its founder and Commissariat for Refugees and Migration as the responsible entity (Article 21, the Asylum Act).
Identification of the risk of contagious diseases that relate to the accommodation conditions is conducted out by the bureau/institution for public health with territorial jurisdiction, which in cooperation with sanitary inspection carries out periodical supervision.

Reports on the conducted supervision are submitted to the Ministry of Health, Commissariat for Refugees and Migration and the Institute for Public Health of Serbia.

Education- bureaus/institutes for public health through their Promotion Centers should carry out activities to promote health and education. Education shall include the centre users, centers' personnel, health care workers in health care centers, local community representatives, police representatives and everybody who is in contact with the refugees.
Persons who do not have information on vaccination should be considered unvaccinated.
Unvaccinated and partially vaccinated persons, who stay in Serbia for longer than 10 days, should be vaccinated or their partial vaccination against certain communicable diseases should be completed, in accordance with the Regulations on immunization and the procedure of protection with medication ("Sl.gl. Rs. 11/06) or with the Regulations on amendments of the Regulations on immunization and the procedure of protection with medication ("Sl.gl. RS. 25/13)
Immunization against certain communicable diseases includes mandatory active immunization of persons of certain age, persons exposed to certain communicable diseases and persons with clinical indications.

The procedure regarding tuberculosis in registered migrants in the Republic of Serbia is conducted in accordance with the "Guidelines for preventing and combating tuberculosis in the Republic of Serbia" in accordance with Article 40 of the Asylum Act ("Sl.gl. RS. No. 109/07).

In the case of diagnosing **multiresistant tuberculosis**, an advisory decision is made regarding the isolation and the institution where an initial clinical phase of treatment shall be conducted on the patient, the course of treatment, the length of treatment and check-ups.

In the case of a migrant who has a contagious type of tuberculosis of the lungs and refuses to be treated, isolation of the patient is conducted with cooperation of the sanitary inspector and Serbian Ministry of Interior, until an agreement on accepting the treatment is reached.

BCG vaccinations are conducted on infants right after birth, no later than one year after that for children born on the territory of the Republic of Serbia. A vaccination certificate is issued.

Conclusion

Migration and international population mobility are facts of life on a global scale. The scope of population migration inside and outside of national borders creates a situation where a large number of various and different populations are put in a position to live together. Traditional approach to administrative management of migration processes cannot answer the many needs of migrants, especially the medical needs, nor can it answer to the effect that these people in transit can have on the population of the host country. Recognizing the health needs of migrants, with the aim to protect them and to improve their health, avoiding stigmatization and marginalization, can decrease health care and social expenses in the long run, protect global public health, to make integration easier, and to contribute to social and economic cohesion and development.

Many health issues regarding the contemporary migrations have their origin in international and global regional differences in health indicators and determiners of health. National and international politics and programmes maintain existing geopolitical borders and represent traditional approaches to dealing with health and migration. Politics and programmes of health care services for migrants can still be devised on local and national levels but they should be based on maintaining international and global principles and standards. Systematic and integrated approach to migrations and health, in accordance with global

procedures and with respect to the rights of migrants, constitute an effective method of dealing with these problems.

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REGIONAL NETWORK FOR FOOD SAFETY AND QUALITY IN SOUTH-EASTERN EUROPE

Zvonimir Šostar, Teaching Institute of Public Health „Dr Andrija Štampar“, Croatia

Andrija Stampar Teaching Institute of Public Health was founded in 1949 as Public Hygiene Institute. The Institute activities include public health, epidemiology, health ecology, microbiology, school medicine, prevention of addiction, and mental health care. The Institute is a teaching unit and has signed cooperation agreements with many prominent institutions. The Institute iniciated the establishment of the South East European Network for Food Safety and Quality Control (SEEN-FSQC). The Network will include institutions from 11 countries in the Region and the numerous expert groups with the common purpose of the knowledge sharing, training, help for decision-makers, and application of scientific and professional projects.

The primary tasks of the Network include the following domains: health protection, consumer safety, national security, environmental protection and market protection. Standardization, measurability, promotion of the preventive analysis during the production and distribution of goods, advisory supervision, quality and risk management were the main reasons for the foundation of the Network. With the goal of establishment of the independent and uniform authentication of security, stability and quality of food products and prevention of unnecessary exposures to chemical and biological contaminants. Problems that may appear about Network establishments are the regional differences in the technical resources and opportunities, human resources, financial possibilities, time and desire for the establishment of infrastructure and regional availability. In the future the Network will help in positioning of the Network members as south European regional leaders in the independent quality control of food, consumer goods and environment, in strengthening the coordination and advisory role of Network members, in building partner organizations through the exchange of knowledge and in encouraging the development of internationally understandable communication. Other opportunities of the Network are the establishment of regional cross-border project of controlled quality as European project, stronger exchange and adaptation of existing projects, higher scientific cooperation, development of the new project proposals, harmonization of the different regional food safety standards with the EU standards, protection and strengthening the competitiveness of local producers, creation of Network data management system, cooperation with leading laboratories in the world (SGS, etc.) and experience sharing.

MICROBIOLOGY SESSION

Topic: MICROBIOLOGY TODAY

INVITED LECTURES

1. SEVEN YEARS OF THE NATIONAL REFERENCE LABORATORY FOR STREPTOCOCCI IN SERBIA: WHERE ARE WE NOW?

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Serbian National Reference laboratory (NRL) for streptococci was established by the Ministry of Health in 2008. Since the Ministry of Health has not provided funding for NRLs, all costs and activities of the NRL for streptococci are financed by grants of the Ministry of Science of Serbia and through the sponsor funded research projects. At the beginning, we made contact with microbiologists and created collection of streptococcal invasive and resistant strains. Today, the collection include near 300 invasive and 300 macrolide resistant pneumococcal strains, over 2000 group A streptococcal (GAS) strains and around 200 invasive and noninvasive group B streptococcal (GBS) strains. We focused on two aspects of research – introduction of bacterial phenotypic and genotypic typing methods (pneumococcal serotyping, *emm t*yping of GAS, molecular capsular typing of GBS, RAPD, and MLST) and detection of antibiotic resistant genes in streptococci, using PCR. We found that the most prevalent pneumococcal serotypes in our country are 3, 14 and 19F. Resistance rates of meningeal and non-meningeal pneumococcal strains to penicillin were 56% and 20%, respectively. As expected, beta hemolytic streptococci are fully susceptible to beta lactam antibiotics. However, a steady increase in macrolide resistance in streptococci was detected. Overall, macrolide resistance among GAS, GBS and pneumococcal isolates were 12.5%, 38% and 40%, respectively. Our data indicate that macrolide resistance in GAS is result of dissemination of several resistant clones, belonging to *emm* types 77, 12 and 75. The next step is to introduce nucleic acid amplification based methods to detect bacteria in clinical specimens, which will improve diagnosis of invasive disease caused streptococci.

Keywords: *Streptococcus spp.,* NRL for streptococci, bacterial phenotypic and genotypic typing methods

2. A NEW METHODOLOGICAL APPROACH TO MICROBIOLOGICAL RESEARCH

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Medicinski fakultet, Univerzitet u Nišu

Antimicrobial resistance (AMR) represents a rapidly growing public health concern worldwide. The association of essential oils, ie. terpenoids, with antibiotics is one of the novel way to combat AMR.

The antibacterial activity of the essential oils, their major terpenoids and selected antibiotics were investigated by the broth microdilution method. The interactions of the essential oil and the main oil components with standard antibiotics were evaluated using the microdilution checkerboard assay in combination with chemometric and cheminformatic methods.

Investigated essential oils and their main compounds exhibited *in vitro* antibacterial activity against all tested bacterial strains. The combinations, essential oil–antibiotic and the terpenoid–antibiotic produced predominantly synergistic and additive interactions. Using chemometric methods, principal component analysis and hierarchical cluster analysis eliminate any kind of subjective analysis, interpretations and discussions of the results. Molecular docking has helped us in trying to explain the mechanism of antibacterial action of the terpenoid/antibiotic association.

All synergistic combinations, essential oil–antibiotic and terpenoid–antibiotic reduced the minimum effective dose of the antibiotic and, consequently, minimized its adverse side effects. The association of essential oils and their main constituents with antibiotics may be a promising strategy in the battle against bacteria.

Keywords: Essential oil, Checkerboard assay, Chemometrics, Molecular docking.

3. CURRENT APPROACHES FOR DETECTION OF *CLOSTRIDIUM DIFFICILE*, PCR RIBOTYPES CHARACTERIZATION AND PREVENTIVE MEASURES

Rossica Vatcheva-Dobrevska

University Hospital Queen Joanna, Sofia, Bulgaria

In the last two decades, the incidence and the mortality rate of Clostridium difficile infection (CDI) have considerably increased. The growth of infection may be caused by multiple factors including inappropriate antibiotic usage, poor standards of environmental cleanliness, infection control practices, advanced ages and spread of hypervirulent strains. Exogenous infection occurs through infected individuals, contaminated health care workers, nosocomial sources, and contaminated environment. CDI causes 15%–25% of all cases of antibiotic-associated diarrhea, the severity of which ranges from mild diarrhea to fulminant pseudomembranous colitis.

Culture-based microbiological diagnosis is relatively difficult, because of the specific physiological requirements of *C. difficile*. Direct immunoassays for detection of antigen/ toxins in clinical specimens are becoming popular due to their rapidness, and although specific, they lack adequate sensitivity. Since 2008 Bulgaria participate in Pan European Study ECDISNET investigated the CDI prevalence. PCR ribotyping shows in total, nine distinct ribotypes and the most prevalent for Bulgarian hospitals was 017 followed by 014/020, together accounting for 44% of all isolates. An innovative duplex EvaGreen real-time PCR assay based on simultaneous detection of the gluD and tcdB genes was developed for rapid C. difficile identification. Four toxigenic profiles were distinguished by PCR: A+B+CDT” (53.1 %,17/32), A”B+CDT” (28.1 %, 9/32), A+B+CDT+ (9.4 %, 3/32) and A”B”CDT” (9.4 %, 3/32).*C. difficile* infections are very common nosocomial events and are associated with significant morbidity, mortality and hospital costs. Preventing and controlling CDI transmission in hospital environments is therefore a major challenge. Prevention currently involves antimicr obi al stewardship, control of CDI and prevention of cross-transmission through patient isolation in single rooms, hand hygiene, environmental decontamination and careful epidemiological monitoring of CDI cases.

Keywords: *Clostridium difficile*, diarrhea, toxins, ribotypes, prevention

ORAL PRESENTATIONS

1. EMERGING VIRUSES- EBOLA VIRUS

Nada Kuljic-Kapulica, Beograd

Introduction. Ebola virus cause a severe and often deadly hemorrhagic fever. Mortality rates for disease range from 25 percent to 90 percent. Ebola iz considered an emerging infectious disease.Epidemics of Ebola virus have occurred mainly in African countries. The Ebola virus gained widespread attention in the 2014 when an outbreak in West Africa became the largest filovirus outbreak reported in history.

Virus. Ebola virus belong to a family Filoviridae, that consist of two genera, the Ebola and Marburg viruses, which are among the most virulent pathogens in humans. Filovirus particles form long or shot filaments of varying shapes up to 14.000 nanometres in length. Viral particles has single-stranded negative RNA enveloped in a lipid membrane. There are five subtypes of Ebola viruses: Zaire, Sudan, Bundibugyo, Tai Forest and Reston, each named after the location in which it was first identified. The Zaire species of Ebola virus is the causative agent of the 2014-2015 epidemic in West Africa, in which the case fatality rate has been reported to be as high as 70 percent, rates in earlier outbreaks have reached 80 to 90 percent.

Virus detection. The virus induces an early IgM response and positive IgM ELISA tests can be expected after 4-7 days of illness. Earlier positive results may be obtained by reverse transcriptase PCR tests for viral genome. Laboratory-confirmed cases must be positive for the Ebola virus: Either by detection of virus RNA, and/or by detection of Ebola antigen, and/or by detection specific IgM antibodies.

Summary. Ebola virus is a class A bioterrorism agent, known to cause higly lethal hemorrhagic fever. Because the Ebola virus is so hazardous it is classified as a biosafety level 4 agent-the level assigned to the most dangerous agents known. Research using Ebola virus requires facilities with the utmost levels of containment, strict controls on access and highly trained personnel. Scientists lack sufficient diagnostic tools to rapidly identify Ebola infection. They also need a more through understanding about how the virus is transmitted and how it causes disease.

Keywords: Ebola virus, hemorrhagic fever, virus detection.

2. ANTIALGAL ACTIVITY OF COPPER (II) COMPLEX WITH 1, 2-BIS [(1, 3-DIPHENYLPYRAZOL-4-YL) METHYL] DIAMINOETHANE ON *PROTOTHECA WICKERHAMII*

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Objective: The antialgal effect of arylpyrazole ligand, which is a reduced Schiff base, 1,2-bis[(1,3-diphenylpyrazol-4-yl)methyl]diaminoethane (Ph_4Pz_2mde) and its copper complex $CuBr_2[Cu(Ph_4Pz_2mde)Br_2(MeOH)]$ have been examinated.
Methods: The agar well method has been performed in accordance with the Clinical and Laboratory Standards Institute (CLSI). As the solvent and the diluent dimethyl sulfoxide (DMSO) has been used. Nystatin has been used as the standard. The study has been done on the alga *Prototheca wickerhamii*. Examined concentrations were: 64, 32, 8, 1 and 0.125µg/ml. Mathematical approximation of MIC values were determined using functions $y=12.004x^{0.043}$ for ligand and $y=13.873x^{0.0655}$ for the copper complex.
Results: In the examined concentrations, the complex with inhibition of the growth in the range from 14.5126 mm to 15.9029 mm shows better effect, as opposed to the ligand with the maximum inhibition ranging from 12.463 mm to 13.2013 mm. However, the concentration obtained by mathematical approximation for MIC effect is better for the ligand (96.7pg/ml) than for the complex (224pg/ml). Those parameters could not be determined for Nystatin, because this standard antifungal agent showed no effect on the tested microorganism.
Conclusion: Based on these results, we conclude that the examined compounds have strong antialgal effects.
Keywords: *Prototheca wickerhamii*, antialgal, copper compound
Acknowledgements: This work was supported by the Ministry of Education, Science and Technology of the Republic of Serbia (Grant Number 46012 and 41012).

3. CAMPYLOBACTER JEJUNI SENSITIVITY TESTING TO ANTIMICROBIALS

Biljana Miljković Selimović[1,2], Kocić B. [1,2], Babić T. [1], Ristić Lj.[1]
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Campylobactter jejuni **(***C. jejuni*) is one of nowadays the leading causes of bacterial enteritis. The most of patient recover without antibiotic administration, since disease is mild and self-limiting. However, in patients with compromised immune system as well in patients with normal immune system severe forms of disease can occur as prolonged enterocolitis, extraintestinal infections (bacteriemia, peritonitis, cholangiocystitis, pancreatitis, myocarditis) and post infectious sequels when antibiotics administration is necessary. The aim of the investigation was sensitivity testing of *C. jejuni* to antimicrobials using disk-diffusion method, determination of minmum inhibitory contration (MIC) using strips with antibiotic gradient concentration and comparing these two methods. Methodology. Disk-diffusion method was applied according to Kirby- Bauer, and MIC determination according manufacturer instructions. Obtained values were interpreted using CLSI for *Campylobacter*. For antimicrobials not predicted for *Campylobacter* sensitivity testing obtained values were interpreted according CLSI standards for *Enterobacteriaceae*. Results. All tested strains were sensitive to imipenem, and resistance to erythromycin was detected in 1,83% only. Among antibiotics commonly used in therapy, resistance to ciprofloxsacin appeared in 48% investigated strains. Also, resistance to two and more antibiotics it was recorded. Investigated methods expressed good correlation with exception for ceftriaxone and cefotaxime. Conclusion. Disk-difuzion method may be used in everyday praxis. In addition, the monitoring of sensitivity in *C. jejuni* strains it is necessary because of possible threats in resistance increase.

Key words: *Campylobacter jejuni*, antimicrobials, sensitivity

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4. DEVELOPMENT OF THE NEW VAGINAL SUPPOSITORY FORMULATION CONTAINING PROBIOTIC STRAIN LACTOBACILLUS RHAMNOSUS LB-68

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Effects of locally applied lactobacilli for establishing and maintaining balance of the vaginal microflora are well known. Vaginal tablets containing probiotic strain *Lactobacillus rhamnosus* LB-68, were produced by the Torlak Institute and were in use for 28 years at our market. Weaker solubility of former vaginal tablets launched production of the new formulations with fatty, well-soluble carrier of active component *Lactobacillus rhamnosus* LB-68th

Aim of the study: Development of a good soluble vaginal suppository, containing probiotic strain *Lactobacillus rhamnosus* LB-68 in total number of 10^8-10^{10} CFU / ml, which remains viable at refrigerator temperature. Materials and Methods: In period 2011- 2014, in Torlak Institute, 7 different formulations of vaginal suppositories with different types and amounts of fatty components and lyophilized strain LB-68 were produced. Vaginal suppository disintegration and viability of strain were investigated. Every month of the year, in all 7 formulation, the total number of bacteria using method of decimal dilutions and seeding on MRS agar was determined for samples stored at refrigerator temperature. At the same time, samples stored at room temperature, were tested once per month for a period of 3 months. Disintegration of vaginal suppositories were examined in a water bath at temperature 37 ± 1 ° C. Results: Good viability of the strain, contained total number of bacteria of 10^8-10^{10} CFU / ml, over a period of 12 months at refrigerator temperature and 2 months at room temperature was observed in only one formulation, while disintegration results of all formulations met the requirements of Pharmacopoeia.

Conclusion: A new, well soluble formulation was developed, containing total number of 10^8-10^{10} CFU/ml probiotic strain *Lactobacillus rhamnosus* LB-68, that has been shown therapeutic effects and according to the international clinical studies proved antagonistic effect to the pathogenic vaginal bacteria. Determination of other characteristics according to European Pharmacopoeia 8 and preparation of registration documents will be the aim of our further studies.

Keywords: Lactobacillus, vaginal suppository, *Lactobacillus rhamnosus*

5. MONITORING OF CEFALOSPORINS CONSUMPTION AND ANTIMICROBIAL RESISTANCE TRENDS (SMART STUDY) IN A TERTIARY CARE HOSPITAL

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OBJECTIVES: Antibiotics are the most frequently used drugs in hospitalized patients, but studies have shown that the prescribed antibiotics may be inappropriate and may contribute to antibiotic resistance. METHODS: We investigated the trend in resistance to cefalosporins among isolates of Enterobacteriaceae that had been collected from patients in Clinical centre Nis from 2011 to 2013 and evaluated the correlation between resistance to cefalosporins and consumption of said agents as part of the Study for Monitoring Antimicrobial Resistance Trends (SMART). RESULTS: During the study period, the usage of ceftriaxone and that of total cefalosporins increased significantly from 8,66 to 11.21 defined daily doses per 100 bad days (DBD) for ceftriaxone and from 19.81 to 23.32 DBD for total cefalosporins. *E. coli* was the most frequently isolated *Enterobacteriaceae* (53,67%). *E. coli* resistance to ceftriaxone increased significantly from 10% in 2011 to 29% in 2013. We found a significant correlation between ceftriaxone consumption and *E. coli* resistance ($P < 0.05$).

CONCLUSIONS: cephalosporins consumption increased during the study period, with ceftriaxone as the most prescribed antibiotic. There was a positive correlation between ceftriaxone consumption and *E. coli* resistance. Continued monitoring of antimicrobial resistance patterns in the hospital environments is essential to guide effective empiric therapy.

Key words: cefalosporins, ceftriaxone, consumption, antimicrobial resistance, hospital

6. IN VITRO SUSCEPTIBILITIES OF AEROBIC AND FACULTATIVE ANAEROBIC GRAM-NEGATIVE BACILLI ISOLATED FROM PATIENTS WITH INTRAABDOMINAL AND URINARY INFECTIONS: RESULTS FROM SMART STUDY IN CLINICAL CENTER NIŠ 2011–2014.

Branislava Kocić[1,2], Mladenović-Antić S.[2], D. Stanković Djordjević[1,2], Veličković R.[1,3], Dinić M.[1,2], Petrovic J.[3], Mitić R.[3]

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Introduction: Study for Monitoring Antimicrobial Resistance Trends (SMART) was initiated in Serbia in 2011, with 2 sites - Clinical Center of Serbia and Clinical Center Nis. SMART is sponsored by Merck Sharp & Dohme Corp.,This report provides the latest (2011-14) susceptibility data and frequency of extended-spectrum betalactamase-producing (ESBL+) isolates from intra-abdominal and urinary tract infections in Clinical center Niš. Study Methods: a total of 516 clinical isolates of gram-negative bacilli were collected in Center for Microbiology in Institut for Public health Niš. Every year study collect up to 100 consecutive aerobic and facultative gram-negative bacilli from patients with intra-abdominal and 50 urinary tract² infections, including only unique initial isolates, with recording duration of hospitalization (<48 h or ≥48 h) at time of isolate recovery. Confirmation of identification, susceptibility testing, and phenotypic ESBL determinations were done at a central laboratory (IHMA, Inc.) using custom MicroScan dehydrated MIC panels, following CLSI and manufacturer procedures and quality control guidelines. CLSI breakpoints were used to determine susceptibility. Results: The most frequently isolated microorganisms in the period 2011-2014 at the Clinical Center Niš were: *Escherichia coli* (40,1%), *Klebsiella pneumoniae* (23%), *Proteus mirabilis*(9,5%) and *Pseudomonas aeruginosa (*8,7%). The most common ESBL + isolates were *Klebsiella pneumoniae* (84,6%), *Proteus mirabilis* (20,4 %) and *Escherichia coli* (18,35%), respectively. Increase in number of ESBL + isolates in the examined period was noted in *Escherichia coli.* Susceptibility to all of the test antimicrobials in *Escherichia coli* amounts to more than 80%, except for the ampicillin-sulbactam (43%), while in the carbapenem was 100%. the comparison between 2014 and previos three-year investigation period recorded a decrease susceptibility only for the ampicillin-sulbactam. Susceptibility of *Klebsiella spp.* is the lowest of all tested pathogens (around 30% for all tested drugs except carbapenems and amikacin). Sensitivity to imipenem was 85% and 45% to ertapenem. Susceptibility of intra-abdominal isolates is about 55% for all the tested drugs except and amikacin (80%), imipenem (95%) and ertapenem (67%), while in the urinary isolates susceptibility were below 20% for all the tested drugs except amikacin (60%), imipenem (80%) and ertapenem (35%). Reduction of sensitivity to all tested drugs is about 20% of the isolates from urine. The sensitivity of intra-abdominal isolates of *Proteus mirabilis* was about 40% for all tested drugs except piperacillin tazobactam (93%) and ertapenem (100%). Susceptibility to imipenem is 20%. Sensitivity in isolates from urine was approximately 20% of all tested drugs except piperacillin tazobactam (85%), and ertapenem (100%). Susceptibility to imipenem is 5%. The increase in resistance to imipenem is about 15%. In *Pseudomonas aeruginosa* greatest sensitivity is noted to ceftazidime78% and piperacillin- tazobactam (72%). There was an increase in the resistance to all tested drugs except ceftazidime. Of all tested isolates, 254 were determined to be MDR, defined as resistance to 3 or more drug classes. The most commonly isolated MDR pathogens were K. pneumonia, E. coli, *Proteus mirabilis*, Enterobacter cloacae and *Pseudomonas aeruginosa.* Conclusion: Generaly, the data showed reduction of sensitivity especially to quinolones, cephems and carbapenems.The rate of sensitivity *Proteus mirabilis* to imipenem is lowest in urinary isolates. Overall, the sensitivity of intra-abdominal isolates was better than the sensitivity of the isolates obtained from urine, for all tested pathogens.

Key words: SMART, MDR, sensitivity to quinolones, cephems and carbapenems

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7. ANTIMICROBIAL SUSCEPTIBILITY OF HAEMOPHILUS INFLUENZAE ISOLATED FROM CHILDREN WITH OTITIS MEDIA

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Introduction: *Haemophilus influenzae* (*H.influenzae*) is the one of the most common cause of acute otitis media in children. The failure of empirical treatment could be caused by the resistance of etiological agents. Aim: to investigate susceptibility to antibiotics of *H.influenzae* isolated from children with acute otitis media. Material and methods:we investigated susceptibility of 49 isolates of *H.influenzae* obtained from children with acute otitis media. Susceptibility was tested using by E test for ampicillin, amoxicillin/clavulanic acid, cefuroxime, ceftriaxone, erythromycin and azithromycin. Disc diffusion method was used for the nalidixic acid, trimethoprim/sulfamethoxazole and tetracycline.Criteria and interpretation performed according to EUCAST standard. Beta lactamase was detected using by nitrocefin test. This study is a part of the clinical study:» Multicenter trial of resistance of bacteria that causes acute otitis media and sinusitis in children». Results:susceptibility to ampicillin was detected in 73,47% of the tested isolates and MIC_{50} was 0,25µg/ml and MIC_{90} 0,75µg/ml. Production of beta lactamase was detected in 22,45% of isolates. Out of all tested isolates 4,08% was resistant to ampicillin and beta lactamase negative. MIC_{50} and MIC_{90} for the cefuroxime were 1 µg/ml and 2µg/ml respectively. All isolates were susceptible to ceftriaxone MIC values range from 0,016 to 0,032 µg/ml. Susceptibility to nalidixic acid, trimethoprim/sulfamethoxazole and tetracycline was detected in 100%, 73,5% and 67,3% respectively. Conclusion: the majority of isolates were susceptible to amoxicillin/clavulanic acid, and all were susceptible to ceftriaxone.

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8. OUTBREAK OF CARBAPENEM – RESISTANT *Klebsiella pneumoniae* CONTAINING bla_{oxa-48} IN CLINICAL CENTER NIŠ, 2015.

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Objectives. We report an outbreak of *Klebsiella pneumoniae* producing OXA-48 carbapenemase in Clinical center Niš, in patients with no prior travel history to endemic regions. **Methods.** *Between* April 2015 and July 2015, 21 isolates of *Klebsiella pneumoniae* with reduced susceptibility to carbapenems were identified from 15 patients, at General surgery, without epidemiological conections. At July 2015, four OXA-48 carbapenemase *K. pneumoniae* were found in patients epidemiologically linked with each other. That strains from outbreak were clinically and epidemiologically characterized, including susceptibility profiles, phenotyping and molecular typing. **Results.** At 20 July 2015, four patient from the same ICU were clinically infecting by multidrug and carbapenem resistant *Klebsiella pneumoniae*. All of isolates from wounds containing the same resistotype and **phenotype**, suggesting horizontal transfer between species in the patient. All *K. pneumoniae* isolates were positive by the modified Hodge test. Resistance genes were identified by PCR -all isolates harboured the bla_{OXA-48} gene. As a result of this investigation, an outbreak was started on 19 July,and declared on 23 July. Patients with confirmed CPE were placed in isolation under contact precautions. **Conclusions.** Our results demonstrate the value of molecular methods, such as mRT-PCR. Implementation of standard infection control practices, including rapid identification of colonized or infected patients probably be effective for prevention of a spread in the hospital setting. The needs - sensitive, specific, and cost-effective testing methods for routine laboratory use.

Key words: carbapenem resistant *Klebsiella pneumonie*, $bla_{oxa-48,}$ outbreak

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9. PREVENTIVA BALKANICA

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Preventiva Balkanica-The Balkans International Federation of Public and Environmental Health is established 2015 in Niš by colleagues from Serbia and Slovenia, to honor Louis Pasteur and 115 years of Pasteur Institute Niš, which is the oldest preventive health care medical institution in the Balkans.

The Preventiva Balkanica works to disseminate knowledge concerning Public and Environmental Health and promote co-operation between countries where public and environmental health issues are transboundary. It promotes the interchange of people working in this sector and the exchange of scientific and technical nature. Represents and protects the interests of the members, their reputation and professions. As an organization, participates in the preparation of legislation, strategic documents, staff development and planning and other professional guidance and opinions in the field of public and environmental health activities. Amongst other things, the Federation seeks to provide means of exchanging information and experience on public and environmental health, to publish scientific papers and to promote field studies of public and environmental health. Other organizations with an interest in public and environmental health may become associate members. Organizations in the educational field, are eligible to become academic associate members.

Key words: Preventiva Balkanica, Pasteur Institute Niš, Public and Environmental Health

POSTER PRESENTATIONS

1. SEROLOGIC INVESTIGATION OF CHIKUNGUNYA VIRUS INFECTION IN SERBIAN SOLDIERS

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Chikungunya is an infectious disease caused by chikungunya virus from Togaviridae family. The primates are the natural reservoir of chicungunya virus. The Aedes mosquitoes provide viral transmission to humans. Chikungunya is endemic in Africa and Asia. Autochtonous cases in Europe have been recorded in northeastern Italy and France. Autochtonous viral transmission has been registered in America. Aim. In the light of the viral spread over the europian countries, we investigated the presence of IgG antibodies against chikungunya virus in serum samples of soldiers from Serbia before their departure to the peacekeeping mission in Africa. Samples were tested as described by manufacturer. Materials and methods**.** A serologic survey was being conducted in March 2012. 48 healthy soldiers were included into the study. All the sera were tested by ELISA IgG antibodies and indirect immunofluorescent IgM test against chikungunya virus (Euroimmun, Germany). Results. Negative results were obtained for all tested serum samples. Conclusion**.** The results of serological tests indicate that there was no activity of chikungunya virus among Serbian soldiers. Considering worldwide expansion of chicungunya virus, growing transportation, commercial and touristic connections of Serbian population and the presence of vector in surrounding countries alert to potential risk of chicungunya virus appearance in our country.
Key words: Seroprevalence, WNV, TBEV

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2. MECHANISMS OF RESISTANCE TO AMINOGLYCOSIDE AND GLYCOPEPTIDE ANTIBIOTICS IN UROPATHOGENIC BACTERIA

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Urinary tract infections (UTI) are among the most common bacterial infections and they represent not only medical, but also public health and economic problem. Irrational therapy postpones recovery, promotes bacterial resistance, and increases price of treatment, particularly in hospital patients. Aminoglycoside and glycopeptide antibiotics have an important place in the treatment of UTI. Resistance to these two groups of antibiotics is a growing problem, particularly in clinical isolates for which these drugs are primarily used. The predominant mechanism of resistance to glycopeptides is a decreased binding of antibiotics to the target site due to the changes of the structure of peptide precursor of the cell wall. For aminoglycosides, the most common resistance mechanism is enzymatic modification of antibiotics, mainly by transferases (phospho-, nucleotidyl-, adenyl- and acetyltransferases). Important mechanisms are hindering transport through biological membranes and active antibiotics efflux from bacterial cells. Not only do uropathogens have their own specifics, but also urinary tract modifies speed of the development, intensity and way of creating resistance. The differences in antibiogram *in vitro* results and *in vivo* conditions in macroorganisms, often lead to therapeutic failure due to the occurrence of a biofilm, which is generally present in urinary tract, especially in catheterized patients.

3. RESISTANCE OF MYCOBACTERIUM TUBERCULOSIS TO THE FIRST-LINE ANTITUBERCULOSIS DRUGS – 10-YEAR STUDY

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Introduction: An increase of isolated strains *M.tuberculosis* resistant to the first-line antituberculosis drugs has been noted worldwide. Objective: The aim of the study was to determine the prevalence of *M. tuberculosis* resistance to the first-line antituberculosis drugs, with particular emphasis on isolates of multidrug-resistant tuberculosis strains. Material and methods: Retrospective analysis of laboratory records for the period Jan 2005 – Dec 2014 was performed at the Mycobacteriologic Laboratory *for mycobacteria*, Municipal Institute for Lung Disease and Tuberculosis, Belgrade. The isolated strains were tested for four antituberculosis drugs: streptomycin (S), isoniazid (H), rifampicin (R) and ethambutol (E). Results: *M. tuberculosis* was isolated in 2250 patients of whom 1438 (63.9%) were males and 812 (36.1%) females. *M. tuberculosis* resistance to S was registered in 66 (2.93%) patients, to H in 18 (0.8%), to E 9 (0.4%) and to R 2 (0.09%) patients. *M. tuberculosis* poly-resistance was registered in 18 (0.8%) patients and the most frequent combination was SH poly-resistance – in 12 patients. With multidrug resistant tuberculosis 37 (1.64%) patients were diagnosed, of whom 32 (86.5%) men and 5 (13.5%) women. Twenty-six (69%) showed resistance to all four tested drugs – 5 (14%) were resistant to RH, 5 (14%) to RHS and 1 (3%) patient had the RHE combination.
Conclusion: During the 10-year period, in 2250 patients were isolated *M. tuberculosis*. The incidence was significantly higher in men than in women – 63.9% versus 36.1%. The most frequently monoresistance was observed to S (2.93%) and poly-resistance to SH. The frequency of multidrug resistant tuberculosis is low and amounts to 1.64% and is significantly more common in men (86.5%).

4. SENSITIVITY TO ANTIBIOTICS OF STAPHYLOCOCCUS AUREUS STRAINS ISOLATED FROM FOOD SAMPLES AND SWABS

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City of Belgrade Public Health Institute

OBJECTIVE. Preview of resistance *Staphylococcus aureus* strains isolated from food samples and swabs. METHODS: 1. Determination of coagulase-positive *Staphylococci* in foods was performed using the accredited method EN ISO 6888-1, 2. Determination of the presence of coagulase-positive *Staphylococci* in swabs was performed using the accredited validated documented method VDM 0144, 3. For antimicrobial agents susceptibility testing, disk diffusion method was used, from CLSI Guidelines.
RESULTS. From a total of 17893 samples, sensitivity to antibiotics has been tested for 135 isolates of *Staphylococcus aureus:* 99 (73.33%) were found to be resistant to Penicillin, 32 (23.72%) to Tetracycline, 7 (5.19%) to Erythromycin, 4 (2.96%) to Clindamycin, 5 (3.70%) to Gentamicin, 3 (2.22%) to Fusidic Acid, and 2 (1.48%) strains were MRSA.
All tested strains were sensitive to Trimethoprim Sulfamethoxazole, Chloramfenicol and Ciprofloxacin. CONCLUSION. Among the strains tested, highest resistance related to Penicillin - 73.33%.

Key words: *Staphylococcus aureus,* antibiotics, sensitivity.

5. *STREPTOCOCCUS PYOGENES*: A RARE ETIOLOGY OF GONOCCCIC URETHRITIS BALANITIS

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Introduction: *Streptococcus pyogenes* has been implicated as the etiological agent of vulvovaginitis, balanitis and proctitis in prepubescent children. On the other hand urethritis and balanitis due to *S. pyogenes* in adult are very uncommon.

Aim: This study aimed to establish the incidence of non gonococcic urethritis and balanitis caused by *S. pyogenes.*

Material and methods: This study was conducted in the ten year period, from January 2005 to August 2015 in the Laboratory for sexually transmitted diseases of the Center of Microbiology. Bacteriological examination of the urethral and glans swab specimens from patients with urethritis and balanitis was retrospectively analysed.

Results: *S. pyogenes* was isolated from the swab specimens of four patients, two boys and two adolescents. The boys with streptococcal balanitis were four-year-old (isolated in September 2010) and seven-year-old (isolated in January 2011) and had a history of recent upper respiratory tract infection. Streptococcal balanitis and urethritis were diagnosed in June 2011 in seventheen-year-old, and in May 2015 in eighteen-year-old examinee. Both of them claimed that infection occured after penile-oral sexual intercourse. Examinations on *Neisseria gonorrhoeae*, *Chlamydia trachomatis* and *Ureaplasma urealyticum* were negative. In direct microscopic smears from the urethral exudate, large numbers of PMN leukocytes were established and the Gram stain showed gram-positive cocci in pairs and chains. Three out of four isolated *S.pyogenes* strains were sensitive to all antibiotics tested. Only one strain isolated from patient sample with urethritis and balanitis was resistant to tetracycline, ofloxacin, erythromycin and clindamycin.

Conclusion: Incidence of balanitis and urethritis caused by *S. pyogenes* is low both in children and in adults. It is necessary to exclude streptococcal infection in all athypical urethritis, especially in the absence of hazardous sexual situations. The drug resistant *S.pyogenes* must be taken into account when balanitis and urethritis patients should be treated with antibiotics.

Key words: *Streptococcus pyogenes*, urethritis, balanitis

6. SUSCEPTIBILITY OF *BACILLUS CEREUS* TO ANTIBIOTICS

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Introduction: *B.cereus* is a Gram positive, rod-shaped, motile, endospore forming, aerobic or facultative anaerobic, soil-dwelling bacterium. It can cause severe diseases that can be manifested as diarrheic syndrome or emetic syndrome.
Objectives: To determine the prevalence of the susceptibility of *B. cereus* to antibiotics.
Materials and methods: This examination included 13 different antibiotics. For the isolation of *Bacillus cereus* we used MYP agar (Mannitol - Egg Yolk - Polymyxin Agar Base, Liofilchem, Italy). The suspected characteristic colonies were confirmed microscopically (Gram-positive and spore forming bacilli) and by precipitation of hydrolysed lecithin. The susceptibility to antibiotics was carried out by disk diffusion method using tablets (NeoSensitabs, Rosco, Denmark) according to CLSI 2013 and CLSI 2006 criteria for *Enterobacteriaceae*, *Staphylococcus* spp. and *Acinetobacter* spp. on Müller-Hinton agar (Liofilchem, Italy). Beta lactamase production was tested by cefinase disk (bioMérieux, France).
Results: The susceptibility study showed 97.06% *B.cereus* strains susceptible to ciprofloxacin, 96.97% to imipenem, 95.65% to gentamicin, 94.12% to vancomycin, 86.15% to clindamycin, 68.57% to amoxicillin-clavulanate, 65.67% to ampicillin, 61.82% to trimethoprim/sulfamethoxazole, 47.92% to chloramphenicol, 29.23% to ceftriaxone and erythromycin, 27.14% to tetracycline and 10. 61% to rifampicin.

Conclusion: The strains of *B. cereus* were the most susceptible to ciprofloxacin, imipenem, gentamicin, vancomycin and clindamycin. Most strains were resistant to rifampicin, tetracycline, erythromycin and ceftriaxone.

Keywords: *Bacillus cereus*, sensitivity, antibiotics

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HYGIENE AND MEDICAL ECOLOGY SESSION

TOPIC: NUTRITION AND HEALTH

INVITED LECTURES

1. ALZHEIMER DISEASE IN A MEDITERRANEAN COUNTRY- IS THE MEDITERRANEAN DIET PROTECTIVE?

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Alzheimer's disease (AD) is the most common form of dementia mostly affecting the elderly population. In the coming years, the number of individuals with AD will increase as the elderly population worldwide is expected to grow significantly putting an added strain on national health care systems as well as caregivers who will inevitably carry most of the care burden. Thus it has been suggested that early intervention strategies which delay or halt the disease progression will have a strong impact on clinical outcomes. Changes in lifestyle habits such as diet modification or supplementation have been indicated as probable protective factors for a number of chronic conditions including AD. Particular attention has recently been devoted to the Mediterranean diet (MeD) which is rich in the antioxidants Vitamins C and E, polyunsaturated fatty acids and polyphenolic compounds. Several in vitro, animal and population-based studies reported a positive effect between adherence to a MeD and AD prevention, although contrasting views remain. Israel can be a good example comparing Arab and Jewish diets and their impact on the prevalence of AD.

Objectives: Implementation of the MeD diet as the main the leading eating pattern in Israel

Methods: A systematic review of the literature was done to show the epidemiological and physiological possible path of protection between the MeD and AD.

Results: There are many evidences about the protective potential between MeD and AD prevention.

Conclusion: A basic natural diet consisting of MeD products and natural spices may have the potential of postponing AD and lowering the risk factors of the disease combined with normal weight.

***Key words**:* elderly, diet, Alzheimer's disease

2. OPTIMAL NUTRITION FOR ALL'- THE ISRAELI ACTION PLAN

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Malnutrition is a significant public health problem across Europe in the 21st century. Simply put, it means poor or bad nutrition and includes both ends of the nutrition spectrum, with obesity and overweight at one end and under-nutrition at the other. Under-nutrition in Europe has been largely ignored despite having equal cost to society in health and economic terms and severely impacting on the quality of life of those experiencing it. Israel is one of eight countries in Europe who joined the European Nutrition for Health Alliance (ENHA) whose common goals are 'Optimal Nutrition Care for All' in healthcare systems and the community across Europe**.**

Objectives: A national awareness and implementation of better nutrition for all the population

Methods: The Israeli national program which started this year is led by the Ministry of Health and includes the following actions:

- A charter signing of all the stakeholders on May 14th 2015.
- The Implementation of weighing and measuring height in all health care settings.
- Screening for malnutrition and treating those at risk in all health care setting.
- Creating health quality indicators computed on national unified infrastructure as an incentive for assimilating the recommendations.
- Participation in 'Nutrition Day' in November 2015.
- Improving the nutritional quality of food served to patients in hospital settings.
- Policy creation for the continuity of treatment- care sequence.
- 'Efshari-Bari' program for promoting a healthy lifestyle for the entire population.
- Participating in a national committee for food security, creating a national food security basket and research networking.
- A national program for the reformulation of industrial food.
- A committee on the regulation and monitoring of food fortification.

Conclusion: Multidisciplinary teams of stakeholders in Israel must work together at a national level towards reaching the goal of 'Optimal Nutrition Care for All'.

Key words*:* elderly, diet, Alzheimer's disease

3. OBESITY AMONG 7-9 YEAR OLD SCHOOLCHILDREN

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Abstract

One of the basic conditions for the proper growth and development of children and preservation and enhancement of their health is rational and balanced nutrition. In order to achieve quality life of school children, it is necessary to provide proper and adequate nutrition. Food is one of the most significant factors which not only contribute to the preservation and enhancement of health, but also to the prevention of various diseases. Beside various health disorders which arise from the deficiency of general and protective nutrients, obesity has become a much larger health problem.

Objectives: Considering the fact that the epidemic of obesity is spreading more and more, the significance of these researches is to suggest the corrective measures for nutrition and nourishment based on them, as well as the measures for the enhancement of the life quality of school children.

Methods: The research has covered 1020 students of the first and the third grade (aged 7 to 9 years) from 6 city and village schools on the territory of the Republic of Macedonia. Within the research, the students and their parents have been surveyed (basic data, socioeconomic status, diet questionnaire - FFQ and the life quality questionnaire - PedsQL 4.0). Anthropometric examinations have been conducted, too, with children based on the recommendations of WHO.

The Results: Among the subjects there have been 227 (22.4%) children in the state of pre-obesity, whereby there have been more boys than girls (56.4% versus 43.6%). As far as age is concerned, the majority of them were 8 years old - precisely 116 of them. The percentage of the children covered by the research considering obesity in the Republic of Macedonia is 9.8%. Thereby, there are more obese boys (62.6%) than girld (37.4%); in relation to age, the majority of obese subjects are 7 years old (11.4%), then there are respondents aged 9 years (10.3%), and in the end 8-year-old children (9.0%). One of the aims of the research was to determine the influence of the number of meals to obesity. As far as obese respondents are concerned, 51.5% of them have three meals per day, 38.4% have four meals, 8.1% have five, and only 2% have more than five meals per day. This leads us to the conclusion that increasing the number of meals decreases the possibility of the occurrence of obesity. Beside the number of meals, the aim of the research was, also, to determine a diet. We found that the largest number of subjects (662 or 65.4%) eats in the school cafeteria, 26.8% of the students bring food from home, and only 7.8% eat snacks. Children whose nutrition is based on snacks have 35% more chance to be obese in comparison to children who eat in the school cafeteria. Certainly, beside the diet, a type of food that children consume have a great influence on their nourishment. The majority of the subjects (56.2%) eat fried and roasted food, 30.7% eat boiled, and 13% eat dry food. The majority of the obese subjects (52.5%) eat fried or roasted food, and only 12.1% eat boiled food. Children who eat dry food are at almost 70% higher risk to become obese in comparison to children who eat fried or roasted food, and 47% in comparison to children who eat boiled food.

Conclusion: Obesity presents a complex of health problems connected with many factors. It is necessary to change a diet and to establish new, healthy way of life and behaviour, as well as an adequate application of physical activities, which would provide the quality life of school children.

Key words: *nutrition, children, school, food, obesity*

Introduction:
One of the basic conditions for the proper growth and development of children and preservation and enhancement of their health is rational and balanced nutrition. In order to achieve quality life of school children, it is necessary to provide proper and adequate nutrition. Food is one of the most significant factors which not only contribute to the preservation and enhancement of health, but also to the prevention of various diseases. Beside various health disorders which arise from the deficiency of general and protective nutrients, obesity has become a much larger health problem.

When an organism take more carbon hydrates than it needs, in time they transform into fat which deposits in subcutaneous tissue and in that way it causes weight gain. Beside the fat diet, which plays the key role, weight gain also appears as a consequence of the genetic factor, lifestyle and psychological problems. Modern lifestyle, great variety of food, fat food (which seems tastier and whose calories quickly turn into body weight) - all of these are the factors that cause weight gain.

Obesity is a worldwide problem. Billion people in the world have problem with weight, and 22 million of them are children less than 5 years old. Beside the fact that obesity is the main problem in the USA and Western Europe, we can say that it also strikes those less wealthy more and more, even poor countries. The cause is primarily the change of lifestyle. Eating habits are changing more and more and there is more saturated fat and sugar in nutrition.

The number of obese people increases 2 - 4% every two to five years. The most common cause for obesity in children is diet. They consume fast, fat, maybe tasty, but unhealthy food. At the same time, they consume too much sugar, chocolate, chocolate creams, sweets, juices. Children often eat hamburgers, toasts, while salads and vegetables are eaten minimally. We can take an example of a ten-year-old child which should take 2000 calories a day. If they eat a hamburger, they take half of the required daily calorie intake with only one meal. Researches connected with the nutrition habits of young people in the Republic of Macedonia show that children aged 11 use hamburgers as food in 32% of cases. One child usually does not eat only one hamburger during a day. A large amound of soda is drunk with that kind of meals; besides, calories are taken during breakfast and dinner as well. In this way, a large number of calories are taken, and they cannot be spent without physical activity and which deposit in the organism.

Obesity leads to psychological problems, too. A child could eat when they are frustrated or sad, but also when they are happy, when they want to treat themselves for a success. Then, food is a gift or consolation. In such cases, it does not represent the orfganism's need, but emotional and psychological instrument. On the other hand, an obese child could have two kinds of answers to the condition they are in. The first one is frustration, decreased self-respect, and the emergence of complexes because they look diffrent than the other children. The other type of emociolnal reaction is compensation - *I am stronger, untouchable, I can beat other children*. Different derogatory names occur frequently, also joking about and underestimating obese children. Due to all of these, obesity does not represent only esthetic, but also causes a lot of psychological problems, esepcially in children that are in the developing period of life, at the time when they are forming their personality.

Considering the fact that the epidemic of obesity is spreading more and more, the significance of these researches is to suggest the corrective measures for nutrition and nourishment based on them, as well as the measures for the enhancement of the life quality of school children.

Methods:
The research has covered 1020 students of the first and the third grade (aged 7 to 9 years) from 6 city and village schools on the territory of the Republic of Macedonia. Within the research, the students and their parents have been surveyed (basic data, socioeconomic status, diet questionnaire - FFQ and the life quality questionnaire - PedsQL 4.0). Anthropometric examinations have been conducted, too, with children based on the recommendations of WHO.

The results:

Among the subjects there have been 227 (22.4%) children in the state of pre-obesity, whereby there have been more boys than girls (56.4% versus 43.6%). As far as age is concerned, the majority of them were 8 years old - precisely 116 of them. The percentage of the children covered by the research considering obesity in the Republic of Macedonia is 9.8%. Thereby, there are more obese boys (62.6%) than girld (37.4%); in relation to age, the majority of obese subjects are 7 years old (11.4%), then there are respondents aged 9 years (10.3%), and in the end 8-year-old children (9.0%).

Table 1. The structure of subjects according to nourishment and age

	Undernourished		Normally nourished		Pre-obese		Obese		Total	
Age	No.	%	No.	%	No.	%	No.	%	No.	%
7 y.o.	20	11.4	96	54.9	39	22.3	20	11.4	175	100.0
8 y.o.	53	9.9	319	59.5	116	21.6	48	9.0	536	100.0
9 y.o.	24	8.0	174	57.8	72	23.9	31	10.3	301	100.0
Sum	97	9.6	589	58.2	227	22.4	99	9.8	1012	100.0

One of the aims of the research was to determine the influence of the number of meals to obesity. As far as obese respondents are concerned, 51.5% of them have three meals per day, 38.4% have four meals, 8.1% have five, and only 2% have more than five meals per day. This leads us to the conclusion that increasing the number of meals decreases the possibility of the occurrence of obesity.

Table 2. The structure of subjects according to nourishment and number of meals

	Undernourished		Normally nourished		Pre-obese		Obese		Total	
Number of meals	No.	%	No.	%	No.	%	No.	%	No.	%
3	58	59,8	260	44,2	117	51,5	51	51,5	502	49,6
4	22	22,7	214	36,3	78	34,4	38	38,4	352	34,8
5	9	9,3	91	15,4	29	12,8	8	8,1	137	13,5
>5	8	8,2	24	4,1	3	1,3	2	2,0	21	2,1
Sum	97	100,0	589	100,0	227	100,0	99	100,0	1012	100,0

Beside the number of meals, the aim of the research was, also, to determine a diet. We found that the largest number of subjects (662 or 65.4%) eats in the school cafeteria, 26.8% of the students bring food from home, and only 7.8% eat snacks. Children whose nutrition is based on snacks have 35% more chance to be obese in comparison to children who eat in the school cafeteria.

Table 3. The structure of subjects according to nourishment and school nutrition

	Undernourished		Normally nourished		Pre-obese		Obese		Total	
Diet	No.	%	No.	%	No.	%	No.	%	No.	%
School food	54	8.2	375	56.6	155	23.4	78	11.8	662	100,0
Homemade food	27	10.0	172	63.5	56	20.7	16	5.9	271	100,0
Snacks	16	20.3	42	53.2	16	20.3	5	6.3	79	100,0
Sum	97	9.6	589	58.2	227	22.4	99	9.8	1012	100,0

Certainly, beside the diet, a type of food that children consume have a great influence on their nourishment. The majority of the subjects (56.2%) eat fried and roasted food, 30.7% eat boiled, and 13% eat dry food. The majority of the obese subjects (52.5%) eat fried or roasted food, and only 12.1% eat boiled food. Children who eat dry food are at almost 70% higher risk to become obese in comparison to children who eat fried or roasted food, and 47% in comparison to children who eat boiled food.

Table 4. The structure of subjects according to nourishment and a type of food

	Undernourished		Normally nourished		Pre-obese		Obese		Total	
Food	No.	%	No.	%	No.	%	No.	%	No.	%
Dry	9	9,3	80	13,6	72	31,7	35,4	11.8	132	13,0
Fried and roasted	67	69,1	183	31,1	124	54,6	52,5	5.9	569	56,2
Boiled	21	21,6	326	55,3	31	13,7	12,1	6.3	311	30,7
Sum	97	100,0	589	100,0	227	100,0	100,0	9.8	1012	100,0

Conclusion

Obesity presents a complex of health problems connected with many factors. It is necessary to change a diet and to establish new, healthy way of life and behaviour, as well as an adequate application of physical activities, which would provide the quality life of school children.

Prevention measures that should be implemented to decrease the prevalence of obese children are:

- to decrease using the media by children in general;
- to decrease a child's time spent in front of TV;
- to prevent the influence of commercials for unhealthy food to forming proper habits connected to nutrition;
- parents should tell their children that they should not let everything they see on TV influence their choice;
- to influence a child to spend their free time doing other, primarily healthy activities, such as doing sports, playing at home or outside, associating with friends;
- to avoid putting TV in children's room or watching TV during a meal;
- not to buy sweet beverages, but to replace them by water, milk or freshly squeezed fruit;
- to encourage a child to drink a lot of water;
- to offer a choice of healthy food in the house.

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4. EATING DISORDERS-MODERN EPIDEMIC DISEASES

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Eating disorders are getting a growing problem in the contemporary world. Their expansion is usually connected with the subject's high self-criticism, negative body image, the non-stimulating social environment, and constant bombarding with ideal bodies that appear in mass media. Above all, they influnce young girls, who are still searching for their identity. They would like to approach the beauty ideals with the help of the products that are frequently advertised, but usually develop eating disorders. Most often these are anorexia nervosa and bulimia, all the more compulsive and binge eating disorder and the latest – ortoreksija. This phenomenon is lately particularly obvious in the former socialist countries, which have not known it by now.Patients with anorexia and bulimia have altered physical and metabolic conditions due to physiological adaptation to a negative energy balance - starvation; non-physiological manipulations with the digestive system - induced vomiting and rapid introduction of large quantities of energy-rich substances (in binge-eating) and side effects of excessive and inappropriate use of drugs - diuretics and laxatives. People with anorexia have usually low blood pressure, bradycardia, reduced size of the heart ventricles, in particular, thinned wall of the left ventricle and often a mitral valve prolapse. Anorexia causes severe electrolyte disturbances, cardiac arrhythmias, which are often described as the cause of sudden cardiac death. In the case of bulimia (as well as in anorexia) we observe an increase of the parotid gland. Because of frequent vomiting, dentine erosions and dental decay are also often observed. Frequent exposure of the oesophagus to the acidic stomach contents causes inflammation, erosions and even ulcers in the mucosa. If frequent vomiting occurs, it may cause ulceration of the oesophageal-stomach mucosa (Mallory Weiss syndrome) and subsequent hematemesis. Perforation of the oesophagus is rare, as rare is the rupture of the stomach. The slow emptying of the stomach is perceived as discomfort after meals. The constipation is the result of inadequate bowel filling and the failure of the intestinal wall due to the use of laxatives. A clinical condition known as leukopenia or agranulocytosis often occurs (two-thirds of the patients), as well as anemia. The bone marrow stops producing white blood cells, leaving the body unprotected against bacteria and other agents that might invade the tissues, but the changes are reversible.

When the degree of renal failure in patients with anorexia nervosa is moderate, the major physiological effect is reduced filtration, and retention of salt and water, in the severest cases, uremic retention of waste products ensues and acidosis soon develops. Vomiting, abuse of laxatives and diuretics causes the waste of the stomach secretions and the intestinal juices. In this instance the person loses large amounts of water and electrolytes (hypokalaemia, hyponatremia, hypochloremia and metabolic alkalosis).

Changes in the endocrine system are the result of the adjustment of the organism and of the adipose tissue reduction, which normally participates in the activation of steroid hormones. Gonads are secreting small quantities of oestrogens, the ovarian cycle likely will not occur normally. Instead, several months may elapse between menstrual periods, or menstruation may cease altogether (amenorrhea) which is one of the diagnostic symptoms of anorexia nervosa. Reduced oestrogen levels together with elevated levels of cortisol lead to osteoporosis. The thyroid gland secretes two significant hormones, thyroxine and triiodothyronine, commonly called T4 and T3 that have the profound effect of increasing the metabolic rate of the body. T3 is activated in the fatty tissue; therefore, the absence of fat reduces the amount of T3. In the human being, the effect of thyroid hormone on growth is manifest mainly in growing children.

All people with anorexia need treatment. In most cases, this involves seeing a doctor and having regular counselling sessions. A hospital stay is needed for those who are seriously underweight or who have severe medical problems (hypokalaemia and dehydration). The goals of treatment are to restore a healthy weight and healthy eating habits.

Ideally, we can take charge of anorexia with the help of a team that include a mental health professional (such as a psychologist), a medical health professional (such as a doctor or a nurse) and a registered dietitian. After the correction of hypokalaemia and rehydration with fluid infusion and if the patient medical condition is no more life-threatening, the treatment will include medical treatment. If malnutrition or starvation has started to harm the organism, medical treatment will be a top priority. The doctor will treat the medical conditions that have been caused by anorexia such as osteoporosis, heart problems, and depression. Nutritional counselling: a registered dietitian will help the patient take charge of his weight in a healthy way. Patient will learn healthy eating patterns and gain a good understanding of nutrition. Psychotherapy: talking with a psychologist or mental health professional will help the patient cope with the emotional reasons behind anorexia.

The purpose of this study was to determine the connection between the experiencing of one's body image and eating attitudes in normal population (i.e. the study involved 1997 students at University of Ljubljana) and to recognize the dangerof their development of eating disorders.

The data were collected using the Eating Attitudes Test (EAT(and the Body Shape Questionnaire (BSQ). Corelation between results of both tests (measured through Pearson's corelation coeficient) revealed that body image greatly depends on one's eating attitude. The result has also shown presence of many sub-clinical cases of eating disorders already among »healthy« teenage women. On the basis of the connection between results, it would be possible to use the estimation of the students' body image for the prediction of the chances for the appearance of eating disorders in them. The second study includes qualitative analysis of interviews with 9 patients who were hospitalized at the Psychiatric Clinic of Ljubljana and already suffering from eating disorders. Based on qualitative researched, partially structured interviews can determine the causes of these disorders, as well as offer ways for their solution and prevention.

Key words: body image, eating disorders, the treatment of eating disorders.

ORAL PRESENTATIONS
1. DEPRESSION AND OBESITY-IS THERE A CONNECTION?

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Prior reviews have cited evidence for the co-occurrence of obesity and depression, suggesting that these disorders may be causally linked. Objective of this work is to provide a review of the existing literature for the co-management of depression and obesity, as well as the results from our practice.

Methods: A review of the current literature was conducted using EBSCOhost and EMBASE.

Results: Multiple factors contribute to and influence the interplay of obesity and depression among women. Obese women had a significantly higher prevalence of depression than total population. The Patient Health Questionnaire (PHQ-9).is a really useful screening tool for depression for all obese women attending ambulatory care.

Conclusions: The interrelatedness of the obesity and depression is not well understood; the presence of one of the diseases clearly contributes to the manifestation of the other and likely to the ability to treat the other disease. Improved understanding of the relationship between obesity and depressive symptoms may inform future targeted screening and interventions for those at greatest risk of adverse mental and cardiometabolic health outcomes.

Key words: *obesity, depression, comorbidity*

2. PROBIOTICS – ROLE OF HEALTHCARE PROFESSIONALS IN THEIR PROPER SELECTION AND USE

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Although the official opinion of the nutritionists is that daily intake of a variety of foods provides optimal amounts of nutrients, the modern diet is the main reason why some individuals are deficient. Their deficiency is often correlated with insufficient probiotic intake.

Aim: The aim of this study was the analysis of the market of probiotic-enhanced dietary supplements and fortified foods. Our another goal was to investigate patients awareness of probiotic use.

Patients and methods: Investigation included 347 randomly chosen examinees, 187 female and 160 male. Data obtained by filling out the questionnaire are statistically analyzed by using chi-square test of SPSS software, 10th version.

Results: Analysis of marketed products showed different content. Most of the examinees didn't know the composition of used products. 67% of examinees registered the use of probiotic-based dietary supplements and only 13% of them used both probiotic-enhanced foods and supplements. Statistically significant difference was observed in the awareness of meaning and importance of probiotic use in relation to the education level of examinees ($p<0.05$). The most frequent use of probiotics was in patients with gastrointestinal disorders.

Conclusion: The incredible variety of dietary supplements is available in today`s market. With the right selection and use they could have a health-promoting effect which indicates the importance of educating patients by the healthcare professionals. Since they are over-the-counter products, education is preffered for recognising their proper indications and use.

Key words: *dietary supplements, probiotics, selection and use, education of the patients*

POSTER PRESENTATIONS

1. THE INFLUENCE OF DIETARY INTERVENTION ON LOWERING THE INFLAMMATION FACTORS IN OBESE PATIENTS WITH IMPAIRED GLUCOREGULATION

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Objective: Fat tissue produces numerous cytokines and TNF-alpha is one that is partially responsible for insulin resistance. The aim of this study was to detect difference in TNF-alpha level in patients with impaired fasting glucose (IFG) against patients with impaired glucose tolerance (IGT), and to evaluate the effect of dietary intervention on cytokine level.

Methods: The study included 50 obese patients with impaired glycoregulation of both sexes, aged from 45-75 years. Throughout 12 months the patients undergone dietary intervention with low fat content (<30% energy from fat) and high dietary fibre content (>25g/day). Also, 30 minutes of daily exercising was recommended.

Results: Patients within IFG group showed significantly decreased BMI (p=0.003), waist circumference (p=0.003), fasting plasma glucose (p=0.023), total cholesterol (p=0.038), while TNF-alpha decreased, but with no significance (before intervention: 13.66±9.62 pg/ml, after intervention: 12.87±8.93 pg/ml). Patients within IGT group showed decrease in BMI (p=0.002), waist circumference (p=0.002) and 2h OGT-test (p=0.021). TNF-alpha decreased, but with no significance (before intervention: 16.99±8.79 pg/ml, after intervention: 14.73±7.33 pg/ml).

Conclusion: In order to lower TNF-a production besides dietary intervention a more extensive and agressive physical activity is obligatory.

Keywords*: impaired glucoregulation, dietary intervention, tnf-alpha*

2. THE IMPACT OF EXERCISE, DIETING AND FIBRE PROFILE ON LOWERING THE RISK OF DIABETES TYPE 2

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Objectives: Controlled dieting enriched with dietary fibre and fibre fractions (resistant starch) followed by enhanced exercise may lead to decreased body mass, glycemia and lipemia therefore to decreasing the risk of chronic diseases: cardiovascular, diabetes type 2 and cancer varieties.

Methods: Study included 50 obese subjects of both sexes with impaired glucoregulation,divided into 2 groups. In the Group 1 the accent was on dietary fibre intake (>25g/day), while in the Group 2 resistant starch was enhanced (>15g/day). Total calorie intake was 1800 kcal/day.

Results: After 12 months there was no significant difference in lowering the energy intake, exercise, waist circumference and BMI, while the effect was different on lipemia and glycemia. In the Group 1 glycemia was significantly decreased after 2h OGT-test (p=0.034) whileHDL-cholesterol was significantly increased (p=0.024).In the Group 2 both total (p=0.001) and LDL-cholesterol (p=0.011) were lowered. Pearson correlation coefficient showed a significant relationship between change in physical activity and waist circumference in the Group 1 (r=0.402, p=0.047).

Conclusion: Total fibre diet that has led to a reduction in blood glucoses after 2h OGTT is better for prevention of diabetes type 2.

Keywords*: impaired glucoregulation, fibre, resistant starch*

3. THE INFLUENCE OF GENETICALLY MODIFIED FOOD ON THE OCCURRENCE OF ALLERGIC REACTIONS IN PEOPLE

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From the moment when genetically modified (GM) organisms appeared, the scientific and professional public has been permanently expressing the doubt that GM food might be the cause of many health problems (allergic reactions, respiratory problems, mutagenicity), as well as the indirect polluter of the living environment. There are numerous examples that have experimentally confirmed the expressed doubts by laboratory findings on the samples of the consumers of genetically modified products. Genetically modified food is produced from organisms whom certain changed were introduced into their DNA by using genetic engineering methods. This is usually done by the addition of genes (cloning) or the subtraction of genes (genes are removed or deactivated). The plants are modified in order to increase their resistance to insects, fungi, viruses or herbicides, as well as in order to modify their nutritional values, improve their taste or improve their storage. Our paper presents the results of research processes on the influence of genetically modified products on allergic reactions. In this paper, a special emphasis will be on the population of the most represented countries in the production of GM food.

***Key words**: genetically modified food, allergic reactions, anaphylactic shock*

4. THE INFLUENCE OF CIRCADIAN RHYTHM DISORDERSON THE BIOCHEMICAL PROCESSES IN THE BODY

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The biological system contributes to metabolic homeostasis through the regulation of daily circadian rhythms which include the appetite, gastrointestinal function, absorption of nutrients, pancreatic insulin secretion and activation of liver enzymes.A normal daily rhythm is one of the main conditions for the maintenance of energy balance and its disruption may be the cause of many disorders in the body.Circadian dysfunction often results in the appearance of the metabolic syndrome including hyperinsulinemia, hyperlipidemia and obesity.Besides obesity, thecircadian rhythm dysfunctionleads to the increased risk for the development of cancer.One of the approachesfor increasing the efficiency of chrono and pharmacotherapy is the application of medicines and food in a time period when their tolerance is the highest. The efficiency and the toxicity of many medicines vary depending on the relation between the dosing schedule and 24-hour biochemical and physiological rhythms.Based on the results of many studies, we believe that the time-controlled food intake can help people maintain their health, including the prevention of obesity, metabolic syndrome, diabetes and cancer.

***Key words**: circadian rhythm, obesity, metabolic disorder*

5. PROFILING OF ANTIOXIDANT COMPOUNDS OF DIFFERENT EXTRACTS FROM THE ELDERBERRY (*SAMBUCUS NIGRA*)FRUITS

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Oxidative stress is a result of imbalance between the antioxidant defence system and the formation of reactive oxygen species. Elderberry plant (*Sambucus nigra*) is a good source of protein, free and conjugated forms of amino acids, unsaturated fatty acids, fibre fractions, vitamins, antioxidants and minerals. Elderberry has components with high biological activity, primarily polyphenols, such as flavonols, phenolic acids, proanthocyanidins and anthocyanins.

Objectives: The aim of this work was to compare the antioxidant properties of four different extracts from *S. nigra* fruits, evaluating their total phenolic and flavonoid content using *in vitro* methods.

Materials and methods: Elderberry fruits were macerated with four different solvents for five days, protected from light. Samples were then filtered and obtained extracts were used for further analysis. Results were classified according to the solvent which was used for the extraction. The total phenolic content was determined by the Folin-Ciocalteau assay. The amount of total flavonoid content of the extract was determined by Aluminium chloride method.

Results: The highest extraction efficiency was observed for propylene glycol. Also, the propylene glycol extract was with the highest phenolic content, as well as the flavonoid content.

Conclusion: All this results may be useful for the promotion of use of *S. nigra* fruit extract as a natural non-toxic antioxidant, justifying the traditional use of this fruit. The propylene glycol *S. nigra* fruit extract is a good candidate for pharmaceutical plant-based products with beneficial properties on human health.

Key words: elderberry fruits, extraction, antioxidant compounds

6. WATER EXTRACTS OF WILD APPLE FRUIT AS A SOURCE OF ANTIOXIDANT SUBSTANCES FOR USE IN FOOD INDUSTRY

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Wild apple fruit (*Malus sylvestris* (L.) Mill., Rosaceae) contains a large number of biologically active antioxidant substances (including polyphenolic compounds) and it is very important for its nutritional properties, traditional use in folk medicine and for prevention and/or treatment of many diseases caused by oxidative stress (atherosclerosis, diabetes, osteoporosis, cancer).
Therefore, the aim of our study was to estimate polyphenolic content and antioxidant potential of water extracts of wild apple fruit, originated from southern Serbia, obtained by different extraction methods.
Extracts were prepared by maceration, percolation, Soxhlet and ultrasonic extraction, using purified water as a solvent in drug-extract ratio 1:5. Total content of tannins (TT) was determined by vanillin test and expressed as catechin equivalent (CE) and percentage content of anthocyanins (TA) by Eur.Ph.6.0. Antioxidant activity was determined by test with linoleic acid and expressed as %AOA (AntiOxidant Activity).
Depending on used method, TT in extracts ranged from 363.64-709.09 mgCE/100g dry weight and TA from 1.81-4.88%. Water extracts of wild apple fruit demonstrated a good ability to prevent lipid peroxidation, that ranged from 72.20-80.14% (the best ultrasonic extraction) and might be used as a source of natural antioxidant substances in food industry.

Keywords: wild apple fruit, polyphenolic compounds, antioxidant activity

7. USE OF HERBAL DIETARY SUPPLEMENTS IN PATIENTS WITH DIABETES MELLITUS TYPE 2

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Use of herbal dietary supplements in the diabetic population are common, and the purpose is to alleviate the symptoms of this disease. The aim of this study was to investigate the frequency of the use of herbal dietary supplements in patients with diabetes mellitus type 2.

Methods: The research was conducted in 6 Remedia Pharmacies on the territory of Nis during October 2013. The criterion set for the study was to include patients diagnosed with type 2 diabetes who used pharmacotherapy in addition to herbal dietary supplements.

Results: Surveyed women showed a statistically significant difference in the frequency of using herbal supplements compared to the group of men ($P<0.001$). There was a statistically significant difference between the sexes in the use of herbal dietary supplements. The surveyed male respondents most often used products based on ginseng ($P<0.001$) and cinnamon ($P = 0.005$), and women mostly used products based on garlic and St. John's wort ($P=0.005$).

Conclusion: The role of health professionals in healthcare is indispensable and very important. It is essential that doctors and pharmacists recognize safety and efficacy issues prior to recommending herbal dietary supplements for diabetes care because of limited data are available for the use of dietary supplements for diabetes care.

Key words: herbal dietary supplements, diabetes, health professionals.

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8. DIET OF CHILDREN STAY PRESCHOOL IN REPUBLIC OF MACEDONIA

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Objectives: The purpose of the paper is to show the diet of children residing in elementary school.

Methods: For material to work used data from the Institute of Public Health - Skopje for the period from 2013. It applied retrospectively working method.

Results. The structure of the diet as a base of the pyramid is the most typical group of wheat flour, bread, rice noodle with 148 g / day. Milk and dairy products are represented by quantity of 193 g / day, 3-4 times a week. Fresh fruit and fruit products from under-represented with 47 g / day, of which fresh fruit accounts for only 43 g / day. Vegetables are present daily intake by an average of 121 g / day, with fresh vegetables accounted for 99 g / day in the form of salads. Group of meat, meat products, fish, eggs and legumes are usually given 3-4 times nedelno, the meat of which is represented by 31 g / day, the fish is not sufficiently represented only 6 g / day, eggs with 9,2 g / day, and legumes with 15 g / day. **Conclusions.** The diet of the experimental group pre-school children in the Republic of Macedonia in 2013 did not meet the the recommendations for energy intake. Makronutriensite properly balanced, but in terms of their structure should improve the quality of foods that are used in creating makronutritivniot entry.

Keywords: nutrition, children, preschool, Republic of Macedonia

9. THE QUALITY OF DRINKING WATER IN SCHOOLS IN RURAL AREAS IN THE MUNICIPALITY OF KUMANOVO FOR THE PERIOD 2012-2014

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Objectives: to evaluate drinkig water, sanitation and hygiene conditions in schools in rural areas.

Materials and methods: Testing the quality of drinking water from public objects for water supply is carried out under the program for preventive health care. This covers all school buildings in the rural area of the municipality of Kumanovo. Samples for analysis were taken on the fountain in the school buildings. Laboratory analyzes are within the limits of the basic microbiological and physicochemical parameters. Residual disinfectant was determined by on-site sampling. Sanitary and hygienic inspection of facilities for water supply and hygiene conditions in the schools are determined,

Results: Drinking water supply in schools in rural areas in the municipality of Kumanovo is through local rural water supply or from its own building. In the period from 2012 to 2014 were examined 378 samples of drinking water in schools in rural areas. Of these, 17.5 % does not fit in relation to the microbiological quality, and in 39 samples of the proven presence of bacteria Escherichia coli. In relation to the physicochemical parameters are incorrect 129 samples or 34.1%. In 123 samples of water were proved by the increased concentration of nitrates. In any instance of the test water, has not been proven residual disinfectant.

Conclusion: Drinking-water supply to school should meet national standards and follow WHO guidelines. In practice, this means that sources for water supply must be protected and should be carried out continuously disinfect water.

Key words: drinkig water, Escherichia coli, rural

10. THE CHILDREN DISEASES RELATED TO NUTRITION

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Introduction: The most sensitive categories of the population are children under 7 years.

Objective: The aim of this study was to determine the frequency of certain long-term illnesses that affect or may affect the diet of children under 7 years of age.

Materials and methods: The data were obtained by analysis of medical records in the first six months of this year. The acute infectious diseases are not considered in this study because of the short-acting the health status of children.

Results:The analysis covered morbidity data on the health status of 1,452 children in Valjevo. It was found that 95 children have a disease, which makes 6.54% of the initial sample. Among the registered diseases, present as allergic diseases - in 34 child (35.8%), asthma and obstructive bronchitis - 19 patients (20%), psychomotor slowed growth - in 10 patients (10.5%) and eczema - in 8 patients (8.4%), while other diseases constitute a very mixed group of 24 sick children (25,2%).From the present allergy, 17 of them is caused by nutritional agents.

Conclusions: Upon the obtained results, there is no significant presence of the disease, which may have an impact on the nutrition of children up to 7 years. Preservation and improvement of children health remains an important preventive task of the health system in modern society.

Keywords: children, health, analysis of morbidity

11. MINERALS IN NUTS

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Nuts is a special group of foods in which belong walnuts, almonds, peanuts, hazelnuts, pistachios etc. This is the fruit of high calorific value, a significant protein content, rich in vitamins and minerals, and therefore it is necessary for a balanced diet.

Objective: Chemistry analisys of minerals in nuts and assessment of their importance in the daily diet.

Results: Different kinds of nuts were analyzed: almonds, hazelnuts, peanuts, pistachios, cashews, walnuts and Brazil nuts. The analysis included the following minerals: copper, iron, zinc, manganese, calcium, sodium, potassium, magnesium, selenium, barium and molybdenum.
The content of these minerals, expressed as mg / 100g, exceeds the recommended daily intake of some to micro, macro elements and trace elements in food.

Conclusion: Minerals are extremely important for the normal functioning of any organism. Their dietary deficiency manifests whole series of seemingly insignificant damage, but ultimately serious, and even fatal. Some scientists believe that the minerals more important than vitamins, because in living organisms almost never can create. Because of these facts, nuts should be represented as an important source of minerals in our diet. Nuts are not only delicious but also very healthy.

Key words: nuts, minerals, contents

12. ADIPONECTIN IS VALUABLE SERUM MARKER IN DIFFERENTIATION METABOLICALLY HEALTHY AND UNHEALTHY OBESITY

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Objectives: To estimate the prevalence of obesity with normal adiponectinemia, to test if adiponectin levels differentiate metabolically healthy and metabolically unhealthy subjects and to determine associations between adiponectin and anthropometric parameters.

Methods: The clinical-laboratory study included 130 subjects both sex (50 patients with overweight, 50 obese patients and 30 examinees with normal weight). Determined anthropometric parameters, ostheodensitometric determination of whole body fat in all subjects were performed. Serum adiponectin concentration was measured by ultrasensitive-ELISA method.

Results: Among the whole study group, 34% of subjects were metabolically healthy, whereby prevalence was 30% in men and 37% in women ($p<0.05$). Prevalence of metabolically healthy obese subjects with normal adiponectinemia was 16% (prevalence was 15% in men and 18% in women) ($p>0.05$). Metabolically healthy overweight/obese subjects had significantly higher adiponectin levels (1502.13±218.27 pg/mL) compared to metabolically unhealthy overweigh/obese (1263.56±516.32 pg/mL, $p<0.01$). Adiponectin level was significant negatively correlated with anthropometric parameters: waist circumference ($r=-0.365$, $p<0.01$), waist/hip ratio ($r=-0.335$, $p<0.01$), BMI ($r=-0.284$, $p<0.05$), Correlation between adiponectin levels with body fat percentage is negative but not statistically significant ($r=-0.155$, $p>0.05$).

Conclusion: Our findings suggest that adiponectin is useful in differentiating metabolically healthy overweight/obese subjects from metabolically unhealthy overweight/obese subjects**.**

Key words: adiponectin, metabolically healthy and unhealthy obesity.

13. RELATION BETWEEN SERUM ADIPONECTIN AND CERTAIN PARAMETERS OF LIPID STATUS

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Objectives: To examine the relationship between serum adiponectin level and certain parameters of lipid metabolism in patients with a wide range of body weight.

Methods: The study involved 100 female subjects of wide range of body weight. All the examinees had the following biochemical parameters determined (total cholesterol, triglycerides, HDL cholesterol, LDL cholesterol). Waist circumference, height and weight were measured for all participants and their body mass index was calculated. Ostheodensitometric determination body fat percentage were performed. Adiponectin was measured by using the ultrasesitive ELISA method.

Results: Serum adiponectin was significantly lower in the group with obese patients - those with disturbed lipide status, compared to the group with pre-obesity and it was the highest in patients with normal weight (1228.45±425.17<1402.17±524.25<1715.67±567.35 pg/mL, $p<0.05$). Adiponectin level was significantly negative in correlation with triglycerides ($r=-0.454$; $p<0.01$), total cholesterol ($r=-0.335$; $p<0.05$), LDL-C ($r=-0.284$; $p<0.05$), atherogenic-index (total-C-HDL-C)/HDL-C ($r=-0.232$), and positively correlated with HDL-C ($r=0.210$, $p<0.05$). Value of adiponectin ≥1438.86±521.23 pg/mL was associated with a lower risk of dyslipidemia in obesity. The results showed a slightly positive correlation between adiponectin and serum HDL ($r = 0.155$, $p<0.01$)

Conclusion: Hypoadiponectinemia may contribute to progression and/or development of lipid abnormalities and thus probably partly it is responsible for the atherogenic risk seen in the metabolic syndrome.

Key words: adiponectin, obesity, dyslipidemia.

14. FLAVONOID CONTENT OF BLACK CURRANT (RIBESNIGRUM L.) JUICES

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Abstract

Black currants are one of the most investigated berries due to high contents of polyphenols – anthocyans and flavonoids. Flavonoids are plant secondary metabolites, liable for antioxidative and anti-inflammatory activity, blood pressure reduction, vasodilatation, chempoprevention and many more. Black currants major flavonols are myricetin, quercetin and kaempferol. The aim of this research was to determine the contents of flavonoids in juices of 4 black currant varieties, grown on the territory of Serbia. Flavonoids were quantified using high-pressure liquid chromatography and were eluated with gradient. Myricetin was dominant flavonol in all 4 samples, with highest contents in BC 4 (44.48±0.48 mg/100 g) and BC 2 (41.48±0.3 mg/100 g). The lowest yield displayed kaempferol. BC 4 variety exhibited highest flavonoid content and it should be subjected to further research.

Keywords: black currants, flavonoids, myricetin, quercetin, kaempferol.

Introduction

Flavonoids present a well-known group of plant secondary metabolites that has beneficial effect on human health. They comprise the non-nutritive group of the molecules that count nearly 9000 different names (1). They are synthesized in plants organs and have different roles in their development and reproduction. The main flavonoid task is to provide fragrance, color and taste and make plant more attractive to humans, animals, insects and birds, as well (2). Environmental conditions have significant impact on synthesis of flavonoids (temperature extremes, UV-B radiation, heavy metals). These conditions were the sources of free-radicals and flavonoids act as a defense mechanism in reduction of the effects caused by reactive oxygen species (3). Beside these conditions, flavonoid production is strongly influenced by geographic position and genetic background of the plant (4).

Considerable amounts of flavonoids were consumed with tea, cocoa, apples, citruses and berries, as well in Western Societies. Estimated intake of flavonoids is more than 1g per day (5) and even more in French population (6). According to the literature, flavonols make over 30% of the black currants composition (7), however every variety shows unique fingerprint of synthesized flavonols. This fact is explained by different growing conditions, weather and genetic of the plant. The main flavonols in black currants are myricetin, quercetin and kaemferol.

The aim of this research was to determine the contents of flavonoids in juices of 4 black currant varieties.

Materials and Methods

The juices used for the experiment, were made from the fresh, undamaged samples of berries. The samples were grown on the territory of Serbia, according to integrated protection practice, which consists of minimum use of chemicals. Flavonoids were quantified using Agilent 1200 HPLC, with a diode array detector, an automatic sampler, and a control system. Mobile phase consisted of trifluoroacetic acid solution and acetonitrile. The samples were eluted with gradient. The results were expressed as mg of flavonoid in 100 g of juice.

Results and Discussion

Myricetin was dominant flavonol in all samples, with highest contents in BC 4 (44.48±0.48 mg/100 g) and BC 2 (41.48±0.3 mg/100 g). The lowest yield displayed kaempferol. All results are given in Table 1.

Table 1. Flavonoid content of black currant *(Ribes nigrum* L.) juices

Sample	**Myricetin** mg/100 g	**Quercetin** mg/100 g	**Kaempferol** mg/100 g
BC1	34.47±0.04	4.05±0.06	1.56±0.04
BC2	41.03±0.21	5.39±0.05	2.04±0.03
BC3	22.82±0.09	5.27±0.08	1.36±0.06
BC4	44.48±0.12	2.28±0.04	0.71±0.01

These results are in concordance with the facts of US Department of Agriculture National Nutrient Database (8), where European raw black currant shows the same presence and quantity of flavonols. Del Rio (9) displayed the same presence of dominant flavonols for examined black currants, although our values were significantly higher (8.9 and 20.3 mg/100g). Laaksonen (10) examined phenolic profile of black currant juices processed enzimatically and non-enzimatically and results were in concordance with ours, although their values were significantly lower. On other side, there are authors which found different presence of flavonols in black currants. So Zheng (11) found quercetin-3-*O*-glucoside as dominant flavonol in 3 black currants varieties grown in south of Finland. Differences in flavonol content may be consequence of several reasons. First of all, environmental conditions, then, myricetin unstability and sensitivity in the presence of other compounds (12). Hakkinen (7) also recognized that the main problem could be the usage of different samples preparation and analysis methods.

Conclusion

Black currants represent significant source of flavonoids and varieties grown on territory of Serbia should be conducted to further research.

Acknowledgements

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15. ANTIOXIDANT ACTIVITY OF THE EXTRACTS AND ESSENTIAL OIL OF *SATUREJA KITAIBELII* WIERZB. EX HEUFF.

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Objectives: The plant species of the genus *Satureja* L. have long been known for their therapeutic properties as well as for their use as strong spices and flavorings. The aim of the study is to define the antioxidant capacity of the essential oil and extracts from the aerial parts of *S. kitaibelii* collected in Kamenica, near Niš.

Material and methods: The essential oil (EO) was isolated by the hydrodistillation method. The methanolic and ethanolic extracts were obtained by maceration while the aqueous extract was the water fraction obtained after isolating the EO. Antioxidant capacity was assessed using two complementary methods, which estimated the ability to scavenge free radicals in 2,2-diphenyl-1-picrylhydrazyl (DPPH) test, and to inhibit lipoperoxidation in *β*-caroten/linoleic acid (BL) test.

Results: The concentrations of the samples that provided 50% inhibition of free radicals (IC_{50}) were calculated from the concentration/inhibition curves. All extracts expressed powerful antioxidant activity, while the EO exhibited much weaker effects in both test-systems ($p<0.05$). The aqueous extract was the most effective in DPPH test (IC_{50}=15.94±1.64 µg/mL) and the ethanolic extract was superior in BL model (IC_{50}=61.93±15.13 µg/mL).

Conclusion: Due to the antioxidant properties, the EO and primary extracts of *S. kitaibelii* may play a significant role in stabilizing food products.

Keywords: Satureja kitaibelii, essential oil, extracts, antioxidant activity

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16. ANTIOXIDANT ACTIVITY OF *THYMUS GLABRESCENS* WILLD. ETHANOLIC EXTRACTS

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Objectives: Most of species from the genus *Thymus* L. were used in the food, cosmetic and pharmaceutical industries, due to their biological properties. The aim of this research was to determine the contents of total polyphenols and tannins in *Thymus glabrescens* ethanolic extracts and to evaluate their antioxidant activity.

Materials and methods: The above-ground part of the plant species *T. glabrescens* was collected in June 2010, 2011 and 2012. The extracts are obtained by ultrasonic method with the ethanol. The total polyphenolic and tannins contents were determined by using Folin-Ciocalteu method by Hagerman. The antioxidant capacity was evaluated using *in vitro* test in 2,2-diphenyl-1-picrylhydrazyl ($DPPH^{\cdot}$) system.

Results: There was no statistically significant difference in the content of total polyphenols and tannins in extracts amongst the years. The highest amount of polyphenols was noticed in the extract from 2010. The extract from 2011 was the richest in tannins, and also demonstrated the highest antioxidant potential.

Conclusion: Our results showed that *T. glabrescens* ethanolic extracts exhibit strong antioxidant activity that is highly correlated with the tannins content. Therefore all the presented facts may contribute greatly in related further research.

Keywords: Thymus glabrescens, antioxidant activity, polyphenols, tannins.

Acknowledgements: This research was supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia (Grant no. III 46013 and III 41018).

17. ANTIMICROBIAL ACTIVITY OF WILD AND CULTURED RUE (RUTAGRAVEOLENS L.)

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Objectives: Edible medicinal plant *Ruta graveolens* L. (Rutaceae), rue, has been part of East Asian diets for many years and has dual function as food and medicine. Rue is highly used in the traditional medicine in various countries to treat a variety of ailments, ranging from absence of menstruation to rheumatism and various mental conditions.

Material and methods: In order to investigate and compare antimicrobial activities of the methanolic and ethanolic extracts of wild growing and cultured rue herb, microdilution method was employed. For the antibacterial bioassays six bacterial strains were used: *Bacillus cereus, Listeria monocytogenes, Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa* and *Salmonella enteritidis*. *Candida albicans* and *Aspergilus niger* were used for antifungal estimation.

Results: The samples exhibited moderate antimicrobial activity against most of the bacterial and fungal strains tested. Inhibitory effects on the growth of Gram-positive bacteria were more potent. Extracts of wild rue showed a better antimicrobial activity than cultivated rue extracts and the most active of all tested samples was ethanolic extract of wild rue.

Conclusion: In conclusion, these data suggest antimicrobial activity of different rue extracts and may explain, at least in part, the traditional use of *Ruta graveolens* as medicinal plant and spice.

Keywords: Ruta graveolens L.; antimicrobial activity; microdilution method

This research was supported by the Ministry of Education and Science of the Republic of Serbia (Grant No. III 41018 and III 46013).

18. CHEMICAL COMPOSITION AND ANTIMICROBIAL ACTIVITY OF *ACINOSMAJORANIFOLIUS AND ACINOSSUAVEOLENS* ETHANOLIC EXTRACTS

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Objectives: Many species of genus *Acinos* are used traditionally as antiseptics, stimulants, tonics and antispasmodics. Therefore, their chemical compositions and antimicrobial activities of essential oils, composition and content of fatty acids were studied. This study has been privileged to reveal some data about antimicrobial potential and chemical composition of ethanolic extracts of selected *Acinos* species.

Materials and Methods: Extracts were prepared by maceration with ethanol (Ph. Eur. 6.0). The GC analysis of the extracts was carried out on a GC HP-5890 II apparatus, equipped with the split-splitless injector, attached to HP-5 column and fitted to FID. The same analytical conditions were employed for GC/MS analysis, where HP G 1800C Series II GCD system was used. The constituents were identified by comparison of their mass spectra with those stored in MS libraries, using different search engines, as well as calibrated AMDIS for determination and comparison of retention indices. The quantitative data were obtained electronically from FID area percentage. Antimicrobial activity of the extracts were determined using the disc diffusion assay recommended by NCCLS.

Results: The main compounds of the *A. suaveolens* ethanolic extract were pulegone (22.49%) and isomenthone (11.51%). The ratio of monoterpenes and sesquiterpenes was 57.39% and 17.61%, respectively. The major compounds of the *A. majoranifolius* ethanolic extract were pulegone (45.50%) and isomenthone (24.29%). The monoterpenes were the most abundant compounds (85.03%). The investigated extracts were manifest a moderate antimicrobial activity and inhibited the growth of Gram-negative and Gram-positive bacteria, equally.

Conclusion: Etanol extract of *A majoranifolius* and *A. suaveolens* as well as their essential oil may be considered as a potential sources of pulegone.

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Keywords: Acinos, chemical compositions, antimicrobial activities

19. DAILY FLUID INTAKE AND LOSS AMONG VISITORS OF THE SENIORS' HEALTH FAIR

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Objective: To assess daily fluid intake and loss among visitors of the seniors' (50+) health fair. With aging, people are susceptible to dehydration due to number of internal and external factors. The use of numerous drugs and medications for chronic illnesses with low daily fluid intake increase elderly people's risk of dehydration and hypovolemia, which can lead to worsening of overall health status and even death.

METHOD: We analyzed data of 113 subjects (68 y, BMI=26,9 kg/m2, 33 M, 80 F), gathered through medical check-up including fluid intake and fluid loss questionnaire administered on-site by healthcare professional.

RESULTS: Average daily fluid intake was slightly less than 2 l (1989.8 ml), mainly from water (1196.4 ml) with daily fluid loss estimated to 2.5 l (2535.9 ml), mostly by urination (1592.3 ml). Inadequate fluid intake is present regardless af sex, nutritional status, and current therapy. Present use of pharmacotherapy was reported by 83 (73.5%) subjects, for cardiovascular diseases 43.4%. Regular daily physical activity (30-min continuous walk) was reported by 99 (87.6%) subjects with 102 (90.3%) non-smokers.

CONCLUSION: The risk of inadequate daily fluid intake is present among visitors of seniors' (50+) health fair, regardless of quite healthy living habits (physically active non-smokers).

Key words: fluid intake, hydration, elderly

20. NUTS NUTRITION FACTS

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A nuts are a simple dry fruit with one or two seeds in which the ovary wall becomes very hard (stony or woody) at maturity such as almonds, walnuts, hazelnuts, brazil nuts, cashew nuts and pistachio nuts, as well as the peanut, which is technically a legume but the nutritional composition is close to that of tree nuts.

Nuts provide a range of nutrients, including large quantities of monounsaturated and polyunsaturated fats (49–74% total fat), and moderate amounts of protein (5–25%). Nuts are also a good source of dietary fibre and provide a wide range of essential nutrients, including several B group vitamins (including folate), vitamin E, minerals such as calcium, iron, zinc, potassium and magnesium, antioxidant minerals (selenium, manganese and copper), plus other phytochemicals such as antioxidant compounds (flavonoids and resveratrol) and plant sterols.

Laboratory tested nuts available in markets, using AAS and GC MS, to compare amounts of minerals and fatty acid composition of fats with related available data,.

Data from nuts testing shows agreement of results with available data related with minerals and fatty acid composition of nuts. Selenium in brasil nuts sample was three times less then in available data, still 10 times higher then ADI. Walnut, almond, hazelnut and peanut provide comparable amount of other nutrients as exotic nuts provide.

Key words: nuts, minerals, selenium, fatty acids

21. NUTRITIONAL STATUS OF BELGRADE UNIVERSITY STUDENTS

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Objective: Nutritional status is an important predictor of general health, and the student population is considered vulnerable in terms of general health due to exposure to mental stress. The aim of research was to investigate the nutritional status of students of the Faculties of Medicine, Economics and Veterinary Medicine, University of Belgrade.

Method: The study was based on data analysis of systematic examinations at the Department of Student Health Care in Belgrade. We measured body weight and height, and calculated the Body Mass Index, based on the criteria of the World Health Organisation.

Results: Results of the examination of the freshmen show that there is a significant difference with regard to gender and the BMI between three faculties ($p < 0.001$). The highest proportion of students with normal weight are at the Medical Faculty compared to the Faculties of Economics and Veterinary Medicine (77.2% vs.70.3% vs.79.6%). The proportion of overweight and obese students is the highest at the Faculty of Veterinary medicine, compared to the Faculties of Medicine and Economics (19.0% and 5.0% vs 11.4% and 1.8% vs. 8.0% and 0.8%), and the proportion of underweight students is the highest at The Faculty of Economic, compared to Medical and Veterinary Medicine Faculties (11.6% vs. 9.6% vs. 5.7%). There are five times more overweight and obese students among men compared to women (21.5% vs. 4.1%) At the repeated systematic examination after two years the percentage of overweight students significantly increased at all faculties (medicine: from 11.4% to 13.8%; veterinary medicine: from 19.0% to 30.1% ; economy: from 8.0% to 9.6%). The gender difference in the percentage of overweight has increased to seven times in favor of men (33.3% vs. 4.8%) ($p < 0.001$). In the category of underweight there are 16 times more women than men (40.8% vs. 2.5%).

Conclusion: Our findings indicate a relatively low incidence of obesity among Belgrade students. However there is a noticeable increasing trend of the percentage of overweight students during studies. Overweight is significantly more common among men compared to women, while malnutrition was more common among women. The results indicate the need to take appropriate preventive measures in order to stop the increasing trend of overweight among students.

Key words: students, nutritional status, overweight, obesity

22. OBESITY AND MENTAL HEALTH

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Objective: The prevalence of obesity is ever increasing worldwide, and mental diseases, specifically depression, will become the most important morbidity factor in next few decades. The aim of this paper is to investigate the relation between obesity and mental health.

Method: PubMed was browsed for the papers published in the past decade (2006-2015). Key words were: "overweight", "obesity", "mental health", "mental disorders" and “depression”.

Results: The current scientific findings indicate significant association between obesity and psychosomatic disorders. However, in most studies, emphasis is on the somatic consequences of obesity (cardiovascular diseases, diabetes mellitus type 2, etc.). The psychological consequences that dominate are: depression, anxiety, low self-esteem and obsessive-compulsive disorder. Obese people face certain kind of stigmatization and discrimination in everyday life making them a vulnerable category when it comes to mental health.

Conclusion: As a reaction to psychological pressure obese people are exposed, there is a proneness to numerous mental disorders, leading these individuals into a vicious cycle. Aiming at the prevention and prophylaxis of mental disorders among obese patients, there is a need for support of experts from different medical disicplines (psychiatry, psychology, hygiene and others).

Key words: overweight, obesity, mental health, mental disorders

Topic: ENVIRONMENT AND HEALTH

INVITED LECTURES

1. THE EFFECTS OF ROAD TRAFFIC NOISE ON THE CARDIOVASCULAR SYSTEM

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Background

A team of researchers from the Institute of Hygiene and Medical Ecology has undertaken two large epidemiological studies exploring the association between road-traffic noise and blood pressure in urban adults and children. The epidemiological research took place in Belgrade from 2002 to 2010. The first project showed a significant association between night time noise exposure and the proportion of arterial hypertension in urban adults (Belojević et al., 2008b). Later on, the second project was conducted on the population of preschool and school children of the same municipality who were exposed to road-traffic noise at home and at schools they attended. Most recently, an experimental study was conducted from 2010 to 2014, aiming to reveal some mechanisms linking the exposure to road-traffic noise and blood pressure changes in healthy, normotensive, young adults.

Epidemiological studies

A cross-sectional study was conducted in the municipality Stari grad, located in the centre of Belgrade. In total, ten public kindergartens and eight public primary schools are located in this municipality. Investigators contacted preschool children aged 3-7 years and school children aged 7-11 years (1^{st} to 4^{th} grade) and their parents through school boards. Out of 2700 interviewed parents, 1596 (59.1%) returned the questionnaires with the signed approval for examination of their children. The exclusion criteria for the study were chronic diseases related to hypertension (diabetes, renal diseases). The final sample consisted of 328 preschool children (174 boys and 154 girls) and 1113 school children (533 boys and 580 girls).

Road-traffic noise levels were measured in front of all kindergartens and schools and in all 115 streets of this municipality using Hand-Held noise level analyzer type 2250 “Brüel and Kjær”. The presence of public transport was assessed by matching children’s home and school addresses with the official public transport maps. The environment of residence was regarded noisy if Leq exceeded 45 dBA during night (10 pm to 6 am), and quiet if Leq was ≤ 45 dBA. The average Leq of noisy and quiet residences were 55.5±6.7 dB (A) and 41.8±3.0 dBA, respectively. The environment of kindergarten was regarded noisy if daily Leq exceeded 60 dBA, and quiet if Leq was ≤ 60 dBA. The average Leq of the noisy and quiet kindergartens were 66.9±5.3 dBA and 55.7±2.8 dBA, respectively. Children’s blood pressure was measured using mercury sphygmomanometer “Fazzini”, Italy. Cuff sizes of 7.5 cm x 19.5 cm or 11 cm x 27 cm were used according to arm measurement criteria.

The results showed that systolic pressure was significantly higher (5 mm Hg on average) among preschool children from noisy residences and kindergartens compared to children from quiet both environments, but there were no differences in diastolic pressure between the groups (Belojević et al., 2008a). The presented results were in accordance with the study from Bratislava (Regecova and Kellerova, 1995), which reported significantly higher systolic and diastolic blood pressure in preschool children from homes and/or kindergartens exposed to traffic noise of Leq_{24h} >60 dB compared to those from less exposed areas ($Leq_{24h} \leq$ 60 dB). Nevertheless, in the London and Amsterdam study, there was a negative association between daytime road traffic noise at schools and children’s systolic pressure (Van Kempen et al., 2006).

Furthermore, our results among school children revealed that road-traffic noise exposure and presence of public transport were related to an increase in systolic and diastolic pressure. The association between blood pressure and public transport near schools was independent of children's age, gender, body mass index, family history of hypertension, dwelling characteristics, and lifestyle habits (Paunović et al., 2013). Similarly to our results, children living in busy-traffic streets in Germany had by approximately 2 mmHg higher systolic blood pressure than children those living in low-traffic streets (Babisch et al., 2009).

Experimental study

An experimental study was performed in the collaboration between the Institute of Hygiene and Medical Ecology and the Multidisciplinary Center for Arterial Hypertension, Clinical Center of Serbia. The study comprised 130 young, healthy adults (42 men and 88 women), aged 24.88±2.67 years, with normal blood pressure and no chronic diseases

The testing procedure consisted of three phases. At the beginning (before noise exposure), participants rested for 10 minutes in quiet conditions (Leq=40 dBA). In the second phase, participants were exposed to recorded road-traffic noise (Leq=89 dBA) for 10 minutes. After noise exposure, participants remained lying for another 10 minutes in quiet conditions (Leq=40 dBA). Two loudspeakers were placed at both sides of a subject's head at 30 cm distance. Equivalent noise levels were measured with Hand Held Noise Level Analyzer Type 2250 'Brüel & Kjær' at the level of participants' ear. Participants were lying on their back during the whole experiment, connected to the thoracic electrical bioimpedance device that measures blood pressure and hemodynamic parameters of cardiac work and blood flow.

In both men and women, noise exposure provoked a significant increase of both systolic and diastolic blood pressure by 2-4 mmHg. The average increase of systolic pressure was larger in men than in women. Once noise exposure finished, both systolic and diastolic pressures decreased significantly to the level similar to the one in the first experimental phase (Paunović et al., 2014). The presented results are consistent with an earlier experimental study by Sawada (1993), where young normotensive men were exposed to intermittent noises of 80 dB, 90 dB and 100 dB lasting for 20 minutes each. The study reported significant increase of systolic and diastolic pressure and peripheral vascular resistance during noise exposure. Both studies imply that the predominant effect of noise on hemodynamics was vasocinstriction. It is well-known that the underlying mechanism linking noise with vasoconstriction is the activation of the sympathetic nervous system (Babisch, 2002). The second important event was the decrease of stroke volume, which can be interpreted as a compensating mechanism to decrease blood pressure. This is in line with the experimental study in young adults who were exposed to white noise of 80 dBA for 5 minutes. As expected, participants reacted with an increase of total peripheral resistance and blood pressure, but their cardiac output and heart rate remained unaffected (Liu et al., 2007).

Discussion

Several factors linking noise exposure and the function of the cardiovascular system remain unexplained. First, the presented studies were not able to answer the questions on the duration of the effects of noise, the role of stress hormones and the role of noise sensitivity, an inborn trait that predicts one's reaction to noise. Second, we do not know whether there is an adaptation to noise during the experiment or during growth in children. Finally, we are aware that the presented results cannot be easily generalized for use in other studies for several methodological differences related to noise measurement.

Conclusion

Our epidemiological studies conducted in the last decade indicate a positive association between road-traffic noise exposure and blood pressure in urban adults and children. Our experimental research leads the way in

the exploration of the hemodynamic mechanisms underlying the effects of noise on blood pressure in healthy young adults.

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2. AMBIENT AIR POLLUTANTS AND THEIR IMPACT ON RESPIRATORY HEALTH

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ABSTRACT

Air pollutants can produce deleterious effects on the airway, such as airway oxidative stress, pulmonary and systemic inflammation. One pathway implicated in the response to inhaled air pollutants is initiated by the activation of Toll-like receptors (TLRs). Children are particularly susceptible to the effects of air pollution. Exposure to air pollutants plays an important role in the development of chronic obstructive pulmonary disease (COPD) and the origin and development of acute exacerbations COPD (AECOPD). Development and exacerbation of asthma symptoms are associated with exposure to air pollution and can act as an adjuvant to enhance the inflammatory response. The risk of pneumonia also increases when subjects are exposed to high levels of air pollution, especially elderly subjects. Different cytokines and growth factor incurred during the inflammatory process play a role in the pathogenesis of lung fibrosis. Chronic inflammation may promote genetic and possibly epigenetic changes that transform a normal cell through a multi-step process toward malignancy so that lung cancer is also associated with air pollution and smoking tobacco. By reducing air pollution levels, countries can reduce the burden of disease from both chronic and acute respiratory disease, including lung cancer.

Key words: air pollutants, respiratory disease, chronic inflammation

Air pollution is a major environmental risk to health. Outdoor air pollution in both cites and rural areas was estimated to cause 3,7 million premature deaths worldwide in 2012. In developing countries, indoor air pollution from solid fuel use is also a major risk factor for cardiovascular disease, chronic obstructive pulmonary disease and lung cancer among adults (1). There is a strong association between elevated air pollution levels and increased emergency room visits and hospitalizations due to respiratory condition. Air pollutants also negatively and significantly harm lung development, creating an additional risk for developing lung diseases later in life (2).

The ambient air with oxygen gets distributed via airways into alveolar sacs. Every day human inhales about 10.000 L of ambient air into the lung. Because such a large volume of ambient air comes directly in contact with the airway mucosa, the quality of air determines the health of lungs. Impact of air pollution on lung health occurs due to the direct interaction between the external environment and internal biological systems and processes. The innate immune system is one of the first lines of defense against inhaled air contaminants and is characterized by activation of key signaling pathways and inflammatory cell recruitment to the lung. Moreover, a significant amount of inhaled air pollutants enters into the systemic circulation via the lungs and then has the potential to affect other body organs. (3).

Air pollutants have harmful effects on the airway. Particulate pollutants (PM), ozone (O_3), nitrogen dioxide (NO_2) and sulfur dioxide (SO_2) can all produce deleterious effects on the airway, such as airway oxidative stress, pulmonary and systemic inflammation, reduction in airway ciliary activity and amplification of viral infections (4, 5). The most health-damaging particles are those with a diameter of 10 microns or less ($\leq PM_{10}$), which can penetrate and lodge deep inside the lung. Particles smaller than 2,5μm in diameter can penetrate the deepest (alveolar) portions of the lung. If these particles are soluble in water, they pass directly into the blood in the alveolar capillaries (6). Chronic exposure to particles contributes to the risk of developing respiratory disease. Ozone can cause breathing problems, trigger asthma, reduce lung function

and cause lung diseases. Inflammation of the respiratory tract due to SO_2 causes coughing, mucus secretion, aggravation of asthma and chronic bronchitis and makes people more prone to infections of the respiratory tract. Symptoms of bronchitis in asthmatic children increase in association with long-term exposure to NO_2. Reduced lung function growth is also linked to NO_2.

Oxidative stress and inflammation are two primary mechanisms implicated in pulmonary cell injury and tissue damage following exposure to air pollution in general. Pulmonary inflammation is orchestrated through the action of the innate and adaptive immune systems. Ambient air pollutants contribute to the initiation of the inflammatory response and cytotoxic effects within the lung. Some of the well-known inflammatory response pathways include the arachidonic acid/cyclooxygenase (COX) pathway, the nuclear factor-kappa B (NF-κB) pathway and Toll-like receptor (TLR) pathway (7). Air pollution interact with pulmonary epithelium and airway leukocytes such as alveolar macrophages (AM), neutrophils (PMN) and dendrite cells (DC) and can directly initiate cell damage and increase oxidant stress to produce downstream activation of inflammatory responses through above mention pathways. External or internal stimuli can trigger the activation of NF-κB. Activation of NF-κB lead to the production of proinflammatory mediators, including IL-1, IL-6, IL-8, tumor necrosis factor alfa (TNF-α), several interferons and nitric oxide (8). These mediators have the potential to damage the pulmonary epithelium and impair host defense, and may ultimately cause further tissue destruction and functional impairment (figure 1). Oxidative stress has several detrimental consequences, including activation of the transcription factor nuclear factor-κB (NF-κB), reduction in antiproteases, plasma leakage and mucus hypersecretion. In addition it reduces histone deacetylase-2, resulting in amplified inflammation and reduced anti-inflammatory response to corticosteroids. Oxidants in the respiratory tract in relation to the source of origin may be exogenous (cigarette smoke, air pollution) and endogenous (alveolar macrophages, epithelial, endothelial and inflammatory cells). As free radicals cause oxidative damage to biological macromolecules, such as DNA, lipids, and protein, they are believed to be involved in the pathogenesis of many diseases.

The inflammatory response spills from lung into the systemic circulation and cause systemic inflammatory responses which can cause harmful effects in other body organs (9).

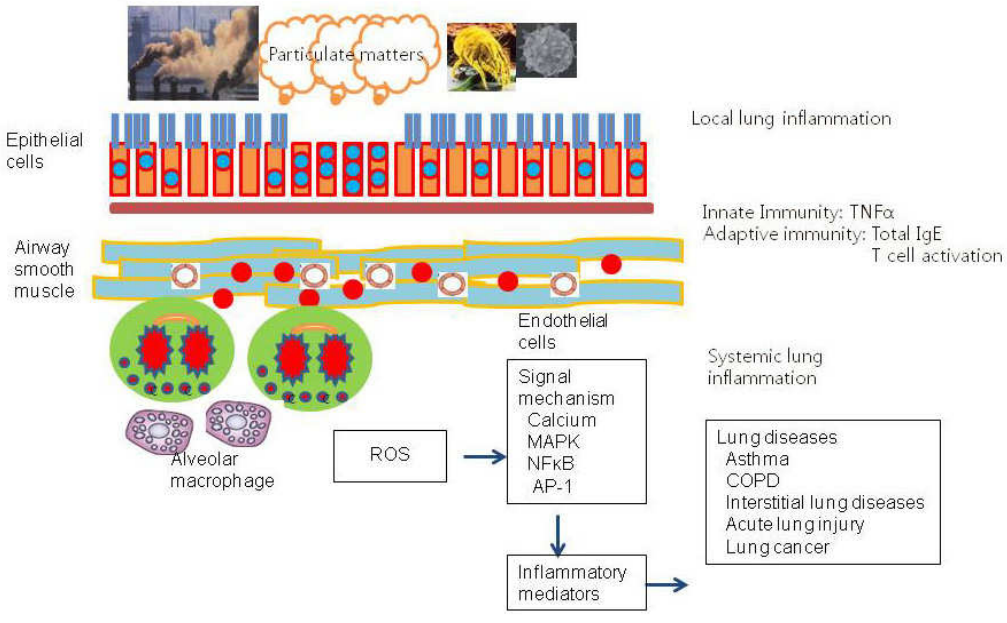

Figure 1. Proposed mechanism of lung diseases by particulate matters (Nel A,Xia T, Madler L, Li N. Toxic potential of materials at the nanolevel. Science 2006;311:622-627).

One pathway implicated in the response to inhaled air pollutants is initiated by the activation of Toll-like receptors (TLRs). TLRs are associated with inflammation, allergy and atopy. TLRs are evolutionarily conserved receptors involved in innate and adaptive immune responses. TLRs not only orchestrate a rapid and robust response to pathogens or foreign agents to maintain homeostasis in response to inhaled agents, but also play a role in the development or exacerbation of respiratory diseases such as allergic asthma (10). In response to TLR activation, resident and recruited pulmonary monocytes, macrophages, neutrophils, epithelial and endothelial cells, and dendritic cells act as surveyors of the pulmonary environment in order to efficiently respond to a foreign agent (11). The signaling pathways for TLR and general inflammatory insults are similar in their utilization of the translocation of NF-κB to the nucleus and subsequent release of proinflammatory cytokines and chemokines (TNF-α, IL-1β, IL-6,IL-8,IL-12) (12, 13). Therefore, the potential for synergistic interaction in the propagation of the inflammatory response exists. Dysfunction and unregulated activation of the TLR pathway can contribute to decreased lung function and the pathogenesis of acute and chronic lung inflammatory diseases, including asthma, COPD, and cystic fibrosis (14).

There is clear evidence for increased susceptibility to air pollution-induced health effects in several sensitive sub-groups of the population. The susceptibility is related to genetic factors, age, diet and pre-existing health conditions (15, 16). The genes that modulate inflammation and antioxidant defense mechanisms are considered to contribute to interindividual variability in response to air pollution (17). Mutation in the genes responsible for reduced glutathione synthesis have been shown to be associated with greater decrements in lung function after exposure to ozone, greater allergic responses and reduced lung function after exposure to diesel exhaust particles (18). Polymorphisms within the nicotinamide adenine dinucleotide phosphate (NADPH) quinine oxidoreductase-1 (NQ01) gene have also shown seem effects (19).

Children are particularly susceptible to the effects of air pollution. The harmful effects of ambient air pollution begin even before the child is born. In a recent study researchers detected the presence more of 200 different chemicals and air pollutants in the umbilical cord blood babies (20). Intrauterine exposure to high levels of traffic-related air pollutants and/or such exposure soon after birth increase the risk of developing allergic disorders, like asthma, in infants (21). Several studies reported positive associations between markers of traffic-related air pollution and increased risk of new-onset asthma and asthma exacerbations accompanied by increased asthma-related hospitalizations in children (22). Children who lived in areas with higher air pollution showed a significant decrease in lung function (FEV1 values) compared with children who lived in areas with lower air pollution levels. Also, environmental exposures in childhood are relevant to the pathogenesis of COPD. Many ambient air pollutants are chemicals that have harmful effects of lung growing. Lung growth guided by a complex and precisely timed sequence of chemical messages. Air pollutants have the potential to interfere with signaling pathways of lung growth. There may be common cellular and molecular mechanisms underlying impaired pulmonary innate host defenses in children exposed to air pollution. Attenuation of lung growth and pulmonary innate host defenses due to air pollution in childhood is a risk factor for adult-onset COPD (23).

Exposure to air pollutants plays an important role in the development of chronic obstructive pulmonary disease (COPD) and the origin and development of acute exacerbations COPD (AECOPD). COPD is a progressive inflammatory condition characterized by narrowing of the airways and these changes are permanent. In high-and-middle-income countries tobacco smoke (including second-hand or passive exposure) is the biggest risk factor, meanwhile in low-income countries exposure to indoor air pollution, such as the use of biomass fuels for cooking and heating, causes the COPD burden. Other risk factors for COPD include occupational dusts and chemicals (such as vapors, irritants and fumes) and frequent lower respiratory infections during childhood (24). COPD is caused by exposure to pollutants that produce inflammation, an immunological response. In large airways, the inflammatory response is referred to as chronic bronchitis. In the tiny air cells at the end of the lung[s] smallest airways it leads to destruction of tissue, or emphysema.

Short-term exposure to air pollution is associated with increased hospitalizations in COPD patients, who often are hospitalized due to impaired defense against infection (25, 26). In contrast to asthma, it remains unclear if long-term exposure to air pollution contributes to the development of COPD; however, associations exist between exacerbations of preexisting COPD due to short-term air pollution exposure. The outdoor air pollutants are significant environmental triggers for acute exacerbation COPD (27).

Asthma is characterized by chronic pulmonary inflammation but differ in mechanism of development, degree of airway remodeling, and physiological alterations then COPD. Asthma is an allergic respiratory disease characterized by airway inflammation and bronchial hyperresponsiveness. Development and exacerbation of asthma symptoms are associated with exposure to air pollution and can act as an adjuvant to enhance the inflammatory response. Exacerbated responses in asthmatic may be related to altered PM-deposition patterns due to altered airway physiology and remodeling, such as hypertrophy of bronchial smooth muscle, transformation of fibroblasts to myofibroblasts, and deposition of subepithelial collagen (28). Air pollution is associated with many sings of asthma aggravation, including airway hyper-responsiveness (AHR), decrease pulmonary function, more reported symptoms and increased hospital admission. There is an association with interactions between air pollution and allergen challenges and changes in immune response. In animal experiments delivery of aerosolized disel exhaust particles (DEP) intranasally, induced a significant increase in metacholine-induced AHR (29).

Asthma and COPD are not the only diseases that occur due to the effects of air pollution. The risk of pneumonia also increases when subjects are exposed to high levels of air pollution, especially elderly subjects. Different cytokines and growth factor incurred during the inflammatory process play a role in the pathogenesis of lung fibrosis. Fine and ultra -fine particles directly stimulate macrophages and epithelial cells to produce inflammatory cytokines such as TNF-α and transforming growth factor beta (TGF-β1), which stimulates fibroblast proliferation and fibrosis (30). Lung cancer is also associated with air pollution and smoking tobacco. Ambient air contains a variety of known human carcinogens that increase the likelihood of lung cancer (31). Fine particles transport many of the carcinogens (in tobacco smoke and in combustion-source air pollution) and may contribute to pulmonary and systemic inflammation. Chronic inflammation may promote genetic and possibly epigenetic changes that transform a normal cell through a multi-step process toward malignancy (32). The most recent data indicate that in 2010, 223000death from lung cancer worldwide resulted from air pollution (33).

Outdoor air pollution is a major environmental health problem affecting everyone in developed and developing countries alike. Air pollutions are involved in the pathogenesis of airway inflammation and aggravate respiratory symptoms. By reducing air pollution levels, countries can reduce the burden of disease from both chronic and acute respiratory disease, including lung cancer.

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ORAL PRESENTATIONS

1. EXPOSURE TO AIR POLLUTION AND OCCURENCE OF PRETERM DELIVERY

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Objective. Exposures to air pollution can affect both mother and newborn. The objective of this paper was to estimate influence of exposure to air pollution on occurence of preterm delivery.

Method. The study sample consisted of 370 nosmokers pregnant women, who were divided into two groups: the exposed group (n=179) and control group (n=121) on the basis of the exposure to air pollution during the firs trimester of pregnancy. Air pollution data were provided by the Public Health Institute of Niš. Blacke smoke ($\mu g/m^3$) was measured by the refractometry method and SO_2 ($\mu g/m^3$) by spectrophotometer. Data on the occurence of preterm delivery were taken from registration of Gynecology clinic in Niš.

Results. There was no statistically significant difference in the occurrence of preterm delivery between exposed and control groups of pregnant women ($\chi^2 = 2.24; p > 0.05$).

Conclusion. Results showed that exposure to air pollution in the firs trimester of pregnancy had not influence on occurence of preterm delivery

Key words: air pollution, preterm delivery, pregnancy.

2. IMPLEMENTING ENVIRONMENT AND HEALTH INFORMATION SYSTEM AS A PROGRAMME ACTIVITY WITHIN PUBLIC HEALTH INSTITUTIONAL FRAMEWORK

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Background

The environment plays an important role in the health and wellbeing of a population, as it provides our basic needs for leading healthy lives. Including clean air and fresh water, the state of the environment is a modifiable risk factor for a number of health conditions, contributing significantly to the global burden of disease (1). The term „environmental health“ describes those aspects of health that are related to the environment, through physical, biological, chemical, social and physiological factors. Environmentla health (EH) covers aspects such as water quality, sanitation, vector-borne diseases and noise (2). Monitoring of EH involves a routine and an ongoing collection, analysis, interpretation and reporting of data on aspects of environmental health. It is important, as robust and reliable scientific information provides key messages for decision-makers, environmental health practitioners and the community, to improve and address EH concerns.

Implementing indicator-based system in EH issues

In this case, indicators provide a means of giving the data an added value by converting the information of direct use to the decision-maker. As it seams, indicators are a crucial link in the decision-making chain: measurements produce raw data; data are aggregated and summarised to provide statistics; statistics are analyzed and re-expressed in the form of indicator; indicators are then fed into decision-making process. Within this framework an EH indicator (EHI) is a measure which summarises in easily understandable and relevant terms some aspects of relationship between the environment and health. It is a way of expressing scientific knowledge about the linkage between environment and health in a form which can help decision-makers to make more informed and more appropriate choices (3, 4).

EHIs could be used for assessing basic status and trends, monitoring of programme objectives, together with building of capacities within national and regional institutions. It is taken into account that the best EHIs are those able to reliably predict the linkage between human health and environmental status, and which are rootinely aggregated, with appreciacion of functional standards for the process, and above all, are precisely defined. Such indicators keep us informed on the population´s health status giving us sufficient insight into environmental status, and as such could be of use in situations when direct and measurable linkage among those twoo data pools is not easily established (6).

Implementing ENHIS (Environment and Health Information System) as a programme activity within the public health institutional framework in Serbia has commenced by the year 2012. The institutional leader for fulfilling this assignment is the National Public Health Institute (6, 7)

Our objective was to present complex environmental health indicators, harmonizing them with the ENHIS methodology, according to the type and quality of data bases available to public health institutions for further analysis, in Serbia. Also, we aimed to produce suggestions for further improvement of existing indicators, and adding up of the new ones, as well. The final goal was to perform innitial steps in environmental health hazard mapping of EH indicators measured and fololowed by the network of public health institutions in Serbia. All of numbered activities resulted with the help of the World Health Organization, which was strongly involved in the process in Serbia since its revision of the EH status, conclusions of which were published in 2009 (8)

Materials and Methods

As a pattern we used an ENHIS model of indicators grouped in four clearly defined groups, Regional Priority Goals (RPGs). The RPGs, identified in 2004, were confirmed in 2010 by the 5th Ministerial Conference on Environment and Health held in Parma, Italy (9,10). For the regular annual ENHIS report the following indicators were analyzed and presented in, according to the RPG pattern:

RPG 1: Ensuring public health by improving access to safe water and sanitation:

– Physico-chemical and microbiological status of the drinking water from public water supply distribution systems in urban settlements (% of them with the presence of certain chemicals), mapped
– Physico-chemical and microbiological status of public recreational and bathing waters, mapped
RPG 3: Preventing disease through improved outdoor and indoor air quality;

– spatial distribution of chronic respiratory diseases compared to higher ambient air concentrations of PM in 2013.
RPG 4: Preventing disease arising from chemical, biological and physical environments.

– we have conducted a cross-sectional study at an industrial site heavily contaminated with lead, with sampling blood of exposed children and testing it on the presence of lead.
In order to perform EH hazard mapping procedures, as a key technical tool we used Geographic Information Systems (GIS).

Environmental health hazard mapping is defined as a set of methods for mapping and analyzing the distribution, character and magnitude of environmental conditions and processes which might pose significant threats to human health.Environmental health hazard mapping is shown to have a wide range of potential applications at the international, national and local level. Key areas of use include:

- support and encouragement of strategic health impact assessment of developments and policies likely to impinge on public health;
- provision of early warning of environmental health hazards and encourage emergency preparedness;
- providing help in informing, involvement and empowerment of the public and other key stakeholders in preventing, controlling and managing environmental health hazards;
- providing help in prioritizing environmental health issues and targeting efforts and resources where they are most needed and likely to be most effective (11).

Geographic Information Systems (GIS) provide a powerful (and indeed essential) technology for carrying out environmental health hazard mapping and for displaying and communicating the results. Although a range of simple mapping tools are available, it is argued that the long-term development of environmental health hazard mapping is best served through the use of proprietary GIS, as noted by the WHO (12, 13).

Data for the RPG1 and RPG3 indicators' analysis were collected through regular environmental monitoring programmes conducted by the network of 23 institutes of public health in Serbia, which are submitted to the National IPH on monthly and annual basis. Health status data are collated and analyzed by the NIPH, and then used for the complex EHIs positioning by the GIS.

Legal framework for ENHIS Serbia. Key legal documents concerning Public Health and EH activities in Serbia are:Law on Health Protection, Law on Public Health, CEHAP for 2009-2015;Law on Protecting Population from Communicable Diseases; Law on the Protection of thePopulation from the Exposure to Tobacco Smoke; Law on Tobacco; Law on health care records;Law on statistical surveys; Law on Water; Law on Food Safety and Law on Environmental Protection (14 - 24).

RESULTS

In order to prioritize the objective concerned with the implementation ofthe GIS in EH hazard mapping, we decided to present only those EHIs that were mapped, in this paper, as given by the RPG pattern, and according to the level of public health concern. meaning that only EHIs for drinking water quality and ambient air quality will be presented.

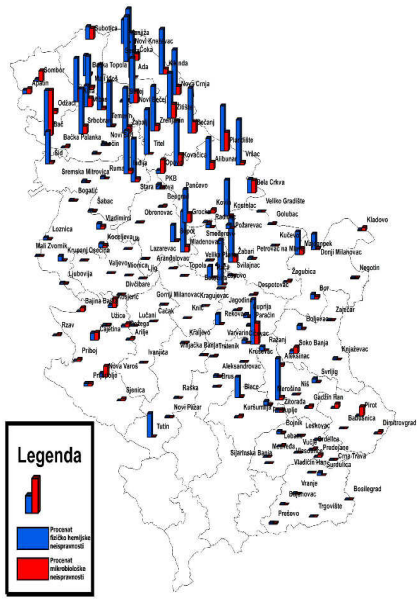
In presenting results for the RPG 1, we chose maps depicting geographical distribution of physico-chemical and microbiological status of the drinking water from public water supply distribution systems in urban settlements (Map 1), together with the Map 2 on physico-chemical and microbiological status of public recreational and bathing waters.

Assessment on the physico-chemical status is undertaken based on the basic level parameters´ lab tests of taken water samples: temperature, colour, turbidity, odour, taste, pH level, eloctro-conductivity, consumed $KMnO_4$ (organic matter contents), ammonia, nitrates, nitrites, iron, manganese, residual chlorine, fluorides), which resulted in the fact that more than 30% of all monitored water distribution systems were labeled as "unsuitable" due to increased concentration of ammonia and KMnO4 consumption. However, in health risk assessment for the population consuming such water, results of such testings should be analyzed based on the parameters of higher public health importance. According to the WHO, indicators of chemical pollution of drinking water are labeled as inorganic (arsenic, lead, fluorides, nitrates, nitrites), and organic (benzene, organochlorine pesticides, VOCs, and trihalomethanes). Elevated concentration of arsenic is regularly noted on the geographic region of the Pannonian Plain (namely, Autonomous Province of Vojvodina, in Serbia), with maximum of the measured 0.24 mg/l in 2013. Due to the non-compliance in the reports from the local level, arsenic's participation in the overall would-be monitoring results of the physic-chemical status of drinking water quality is presumably much higher. Results from the research undertaken in ten water-supply systems in Vojvodina: concentration above limit values in measured in 63% of samples tested on the arsenic presence (*25*). Nitrite concentration increase was noted in 25 public water distribution systems. Samples of drinking water with the maximum of measured nitrite concentration had 4.38 mg/l of nitrites, beingmultiple overdraft values, according to the national by-law (26).

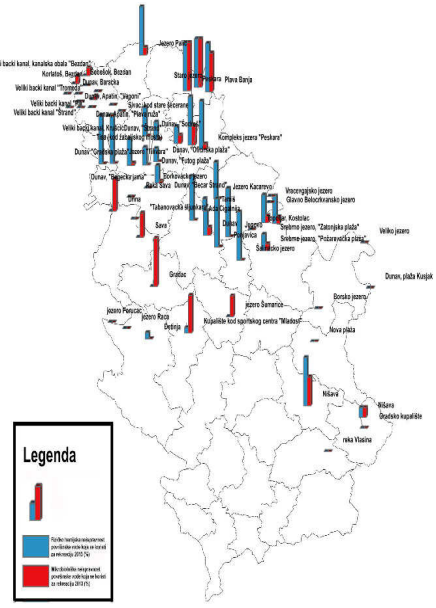
For the whole territory of Republic of Serbia, sampling was conducted at 62 public water fronts in 2013, out of which 24 in central Serbian region and 38 in Vojvodina. 931 samples of recreational water were tested on physico-chemical indicators, noting that 59.7% of them complied with the legislation.

Microbiological status was tested on 1101 water samples, of which 84.8 % complied with the given standards.

Map 1: Physico-chemical and microbiological status of the drinking water from public water supply distribution systems in urban settlements



Map 2: Physico-chemical and microbiological status of public recreational and bathing waters.



In presenting results for the **RPG 3**, we focused on particulate pollution of urban air, choosing maps depicting geographical distribution of: Respiratory disorders vs. black smoke concentration (Map 3) and PM_{10} concentration beyond limit values vs. respiratory disorders (Map 4). Respiratory illnesses monitored and reported to the National IPHfrom the primary health care service (PHCS)are: bronchitis acuta& bronchiolitisacuta, asthma bronchiale and COPD (chronic obstructive pulmonary disease).

The following conclusions were made after a thorough comparative analysis of both concentration of particulate pollutants in ambient air beyond limit values(PM10, black smoke)in major urban habitats in Serbia, and the number of reported respiratory disorders, in the same towns/cities, concerning acute bronchitis & bronchiolitis, asthma and COPD (chronic obstructive pulmonary disease):

Bronchitis acuta*&*Bronchiolitis acutaare respiratory disorders most frequently registered in the primary health care service in 2013 in the following towns:Senta, Kikinda, Novi Sad, Obrenovac, Grabovac, Šabac, Pančevo, Čačak and Niš);

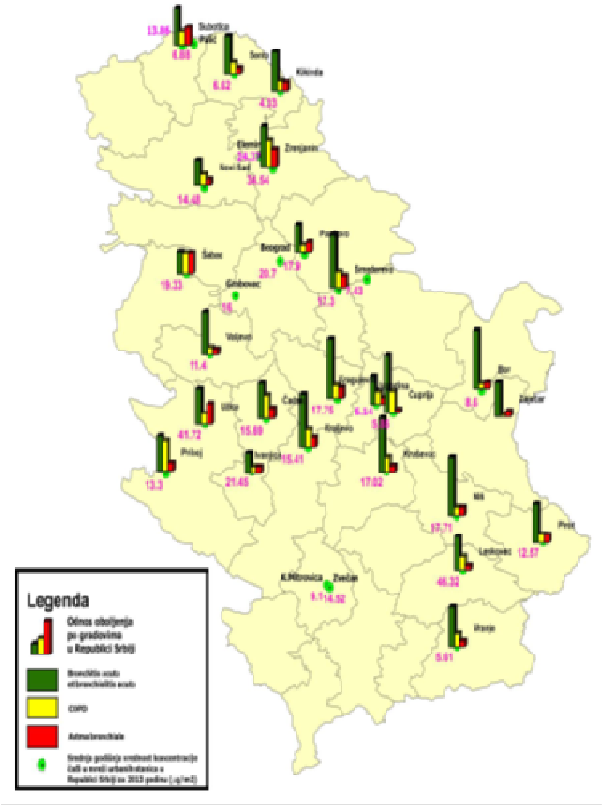
In nine out of ten monitored urban entities ***COPD*** dominated as a key respiratory health problem whose complications were reported to the PHC, putting it at the second position of the list. Towns were such a hierarchy has not been reported were Belgrade, Bor and Užice, in which *Asthma bronchiale*takes the lead.

In Niš, Pirot, Šabac, IvanjicabothAsthmabronchiale and Bronchitis/Bronchiolitis acuta have an equal share when reporting respiratory diseases to PHCS is an issue.

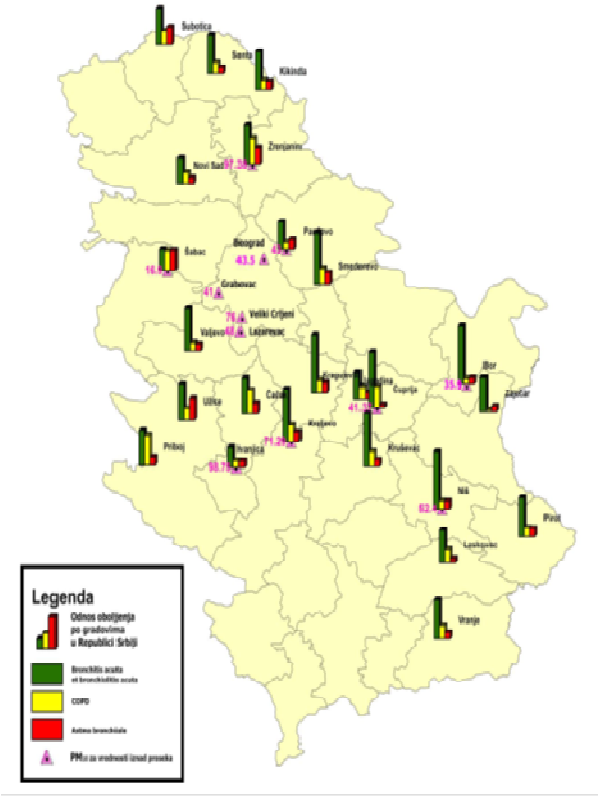
Also, according to the reports from the PHCS, itshows that the least reported respiratory disorder to the PKCS was *Asthma bronchiale*. Actually, this does not mean that this diagnosis is less frequent within the population of the above mentioned towns, but the fact is that we are talking about a grave chronic illness,

whose acutization is a life threatening situation, meaning that patients are most often treated with the targeted therapy in a regular and highly controlled manner.

Map 3:Respiratory disorders vs. black smoke concentration



Map 4: PM_{10} beyond limit values vs. respiratory disorders



Conclusions

After an in-depth analysis of above presented data, together with other EH indicators analyzed in the „Annual report on the ENHIS Serbia“ for 2012-2013 (www.batut.org.rs) we must admit that the set of chosen indicators, together with their analysis need to be presented in a more viable way, more suitable for the decision-makers, both at the local and national level. To achieve such an aim, a series of capacity building activities are needed for the whole network of Institutes of public health, asbeing a system still going through a transition, it is of utmost importance to harmonize EH activities with the EU programmes, of which ENHIS is already a proven part.

According to key social and economic determinants of health, Serbia is still taken into account as a country whose public health and general health care system is going through a period of transition, including its slow improvements implemeted in the specific field of hygiene and environmental health (27,28). Many of the data and much of the experiance relevant to environment and health issues are distributed across different sectors and areas of expertise. Hazard mapping thus, requires a multi-sectorial and multi-disciplinary approach. Development of collaboration between the various sectors and departments is vital if environmental health hazard mapping is to be successful.

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3. INFLUENCE OF AIR POLLUTION ON SPORT RESULTS AND HEALTH OF ATHLETES

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The environment in which physical activity is performed (especially air quality), either recreationally or as a sport is as important as the exercise itself. There are three reasons why the athletes are especially vulnerable to inhaling the air pollutants: increased amount of the inhaled pollutant with the increased ventilation during the exercise, increased air inhalation through the mouth, and increased current and speed of the air enable the pollutants to penetrate deeply into the airways. The research shows that the children which practice sports in environments with polluted air have 3-4 times greater risk of developing respiratory diseases compared to the children who do not practice sports.

Increased concentrations of pollutants such as ultra-fine particles, carbon monoxide and ozone especially affect sport results and health of athletes. Fine particles easily reach pulmonary alveoli and thereby introduce heavy metals into the organism, carbon monoxide increases the level of carboxyhemoglobin in blood and reduces the supply of oxygen to muscles, and ozone leads to the reduction of the pulmonary function. The acute exposure to ozone reduces exercise time, tension, oxygen consumption and exercise performance. It is established that ozone leads to the reduction of athletic performance.

Athletes should avoid areas with high air pollution (up to 15 meters from the side of the road, open spaces where people smoke), as well as physical activity when there is an air pollution alert.

Key words: air pollutant, exercise, sport

4. MONITORING THE CONCENTRATION OF SUSPENDED PARTICLES PM10 AND HEAVY METALS IN THE PM10FRACTION IN THE CITY OF NIS IN THE PERIOD 2011-2014

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Suspended particles have negative effects on human health and because of that they attract attention of experts, regulators and public. Serbian regulations have predicted monitoring two fractions of suspended particles in outdoor air since 2010. The aim of this study was to present the results of monitoring the concentration of suspended particles PM_{10} and heavy metals in the PM_{10} fraction of the City of Nis in the period 2011-2014, as well as to identify possible seasonal variations of concentrations PM_{10} in the same period. Monitoring was carried out at one measuring point in the city, once a week, during a year. It was found that the average annual concentration of PM_{10} was more than the threshold and tolerant values. Also, a high percentage of measurements with the values which were more than the threshold and tolerant values, was found in the winter months. The lead concentration in the PM_{10} fraction of suspended particles in the period of examination were below the threshold and tolerant values.

Key words: suspended particles PM_{10}, heavy metals in the PM_{10}, outdoor air

5. HAZARDS IN DRINKING WATER AT THE SOUTH BACKA DISTRICT

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Objective: Objective was to determine the microbiological and chemical hazards in drinking water at the South Backa District (SBD).

Method: The data of IPHV of 7281 purified-chlorinated drinking water samples (PCW), 1038 unpurified-chlorinated drinking water samples (UCW) and 774 unpurified drinking water samples (UW) from 24, 39 and 39 SBD settlements, respectively, sampled and analyzed by standardized and accredited methods, were used troughout year 2014.

Results: In PCW the most frequently microbiological hazards was Pseudomonas aeruginosae in 54.16% of settlements agents to Thermotolerant Coliforms and fecal streptococcus in 25.00% and 20.83% settlements, respectively. In UCW / UW the most frequently microbiological hazards was Thermotolerant Coliforms in 41.02% / 43.59% of settlements, agents to Pseudomonas aeruginosae and fecal streptococcus established in 33.33% / 23.07% and 23.07% / 33.33% of settlements, respectively. According to chemical hazards, the most dominant in PCW was nitrite established in 12.50% of settlements. In UCW the most frequently chemical hazard was nitrite and arsenic established in 48.72% and 25.64% settlements, respectively. In UW all of the examined chemical hazards were represented in almost equal number of settlements (nitrate and nitrite in 15.38% and arsenic in 17.94%).

Conclusion: According to defined hazards, there is a need for risk assessment in order to ensure drinking water safety in SBD.

Keywords: Public Health, Drinking Water, Hazard, Arsenic, Thermotolerant Coliforms

6. LAW FRAMEWORK FOR ADEQUATE UNDERSTANDING OF EQUIVALENT INHABITANTS –IMPLICATIONS FOR SERBIA HEALTHY WATER SUPPLY

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Water supply is a public utility activity. Serbia has about 150 water supply systems of different sizes and more than two million inhabitans are supplied by these systems. Local public communal companies are in charge for water quality from water source to place for human consumption.

Control of drinking water in Serbia is organised by network authorized medical institutions (Public Health Institutes) according Water Law from 2010 year. Water for human consumption like specific law does not exist and the number of samples is defined by rulebook from 1998 year.

Objective: To analize collected data according principles healthy water supply.

Methods: A review of EU directives and Serbian laws/rulebooks for quantity drinking water in Niš.

Results: To the inhabitants of Niš came only half water from good water source. Losses in the water supply system may cause a risk to human health and lack of control by authorised medical institution that risk could not detected on time.

Conclusion: There is a big difference in the interpretation of quantity water consumption. Implementation of EU Directives (98/83/EC and 2015/1787) in Serbian law may solve this problem and implicate healthy water supply.

Key words: law, drinking water, Serbia, health, water supply

7. EXPOSING OF PILOT STUDY "MONITORING OF SOME ENVIRONMENTAL ELEMENTS OF FLOODED AREAS OF THE CITY OF NIS AND MUNICIPALITY OF DOLJEVAC"

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Background:Floods in the previous 2014 - th year, seriously disrupted the elements of eco - systems of the City of Nis, and arround Municipalities. In March of this -2015. the year due to repeated flooding disrupted more elements of the eco-system of some of the flooded areas happened again.

Objective: To improve the contamination by: locations, types of patterns(samples and cause - bacteriological, physical, chemical, toxicological. Identify possible sources of contamination. According to EPA, possible,,,, bioaccumulation of contaminationexpect to be improve. Crucially we wont to determ,, health risks assesments for the population,, of controlled flooded areas.

Material: As materials have been used samples of : water, soil and drinking water. Water have been sampled: from the tranch which drains off waste water of the Central rubbish-heap of City of Nish,from arable land – fields ; and from the flooded areas in the settlements.

Samples are classified as a surface water and,on the same tame, as waste water too. Soil has been,purposly, sampled on the way that samples, locationaly, form a whole with water samples.

Drinking water were sampled in households which use their own sources of water supply,,.Methods: We used the methods of operation which belongs to the group standard, and prospective.

In : determining the scope of analysis, interpretation of the results of water samples complied with the norms of the legislation for: waste water, surface water, groundwater and sediment.

For soil samples complied with the norms of the Regulations on permitted amounts of hazardous and harmful substances in soil and water for irrigation and methods of their testing (Official Gazette 23/94). As a group,, Substances Hazardous to land and water for irrigation are: cadmium, mercury, arsenic, chromium, nickel and fluorine,,. stipulates that: lead, cadmium, mercury, arsenic, nickel and chromium are the basis of all test samples of soil and water !

All drinking water have been categorized as,, natural water from closed sources,,.For : categoratio of drinking water, determining the scope of analysis and results interpretation the norms of Regulation for hygienic quality of drinking water (Official Gazette SRJ No.42 / 98,44 / 99) have been respected.

Expert opinions for drinking water were,,summa,, of the professional attitude of the Institute; and the ACT waters Fig(Official Gazette 30 / 10, Article 3. ; Clause 5 ; 6.and 7).

Results : The results has been notified as expected, and non-expected. We expected, and proved, water so contaminated with contaminants that were out,,,, class,, (classification;) contaminated soil of land fields ; and drinking water contaminated with indicators old fecal contamination. We did not expect : the negative microbiological result in some samples of water, and drinking water ; or arsenic in a sample of soil of yard of the family house.

Conclusion: The results may be the reason, and the basis for new researches. With done number of samples was not possible to determ,,bioaccumulation,, and the the correlation of contaminants.

Key words: Floods, drinking water, health, contaminants

POSTER PRESENTATIONS

1. PUBLIC HEALTH AS COMMUNITY HEALTH

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Public health and public health issues are not new to us. We live in a global village these days, where health disparities exist between and within nations and reducing these disparities are the interest of public health globally. At a 2009 meeting at the CDC (Centers for Disease Control and Prevention) in Atlanta the vision for public health surveillance in the twenty-first century was discussed and global public health surveillance was found critical for the identification and prevention of emerging and reemerging diseases, both for infectious and non-communicable diseases. In the United States and elsewhere public health surveillance has evolved from monitor-ing infectious diseases to tracking the occur-rence of many non-infectious conditions, such as injuries, birth defects, chronic condi-tions, disability, mental illness, illicit drug use, environmental and occupational exposures to health risks. The meeting identified six major concerns that must be addressed by the public health community to advance public health surveillance in the twenty-first century: lexicon, definitions, and concep-tual framework for public health surveillance; global health surveillance; roles of information sciences and technological advances in public health surveillance; public health surveillance work force of the future; accessing and using data for public health surveillance: legal, policy, ethi-cal, regulatory, and practical concerns related to data sharing; analytical challenges for emerging public health surveillance. Two things missing in the discussions on global public health: (1) terrorism in general, war and bioterrorism in particular (2) chronic disease and disability, which need more focus from the public health community in order to facilitate integration, better service provision, and eventually living with a disability with a good quality of life in spite of the disability. We need to apply what we have learned and know now in order to reduce health inequality in our nations in the future, we need to use advanced technology to improve health and address new health issues as they emerge over time, intervene, and minimize adverse effects. Public health is community health and health care is vital to all of us some of the time, but public health is vital to all of us all of the time.

Key words: public health, community health

2. "ECO - FOUNTAINS" - DRINKING WATER SAFETY IN SOUTH BACKA DISTRICT IN 2014

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Objective: Objective was to determine if drinking water fountains ("eco-fountains") (EF), as alternative sources of water supplying, ensure the drinking water safety (DWS) for population in South Backa District (SBD), comparing to local water supply systems (LWSS).

Method: There were used data of IPHV for 2014 of 211 purified-chlorinated drinking water samples (PCW) from 24 EF in 19 SBD settlements, 1038 unpurified-chlorinated drinking water samples (UCW) and 774 unpurified drinking water samples (UW) from 39 LWSS, sampled and analyzed by standardized and accredited methods.

Results: DWS is determined in 65.66% PCW (2.61% UCW; 10.40% UW); microbiological safety in 88.15% (76.11% UCW; 67.57% UW); physical-chemical safety in 72.73% (4.57% UCW; 17.75% UW). The hazard in PCW were: Thermotolerant Coliforms in 2.84% (5.59% UCW; 17.83% UW), fecal streptococcus in 0.47% (2.31% UCW; 11.11% UW), nitrite in 8.59% (20.47% UCW), arsenic in 2.40% (41.39% UCW; 42.52% UW).

Conclusion: In terms of DWS, EF can be recommended for using. According to capacity and availability of EF there is a problem of ensuring a sufficient amount for proper hygiene practices and food preparing.

Keywords: Public Health, Drinking Water, Hazard, Arsenic, Thermotolerant Coliforms

3. CONTINUITY OF SAFETY DISINFECTION OF BACTERIOLOGICAL WATER QVALITY OF DRINKING KICEVO REGION R.M. OF 2006-2014Y.

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Center for Public Health-Bitola,Department of Hygiene and environmental health-Kicevo, Republic of Macedonia

Objective: Aim of this paper is to give a realistic assessment of development and quality of disinfection of the water supply facilities-Kicevo area and movement of intestinal infectious diseases, as one of the typical indicators of quality of disinfection.

Materials and Methods: Disinfection of drinking water will be displayed through static informational data disinfection,laboratory analyzes of water quality hygienic and epidemiological report on the movement of intestinal infectious diseases.Results will be displayed in tables and graphics.

Results: Up to 2011y.safe drinking water received 83% of the population.From 2663 performed laboratory analyzes of water from the city water and 91 villages connected to the city water supply within 2006-2014y.all showed wholesomeness and proper chlorination.After discontinuation of disinfection till 2013y.again are established regular chlorination only Central Zajas water and disinfected received 15% of the rural population.bacteriological failure of the water has increased from 2% in 2011y.to 7% in 2012y. 11% in 2013y.and 17% in 2014y.The growth and intestinal infectious diseases: 137 in 2010y. 283 in 2011y. 151 in 2012y. and 74 in 2013y.

Conclusion: Disinfection of the city water supply and villages connected to the city water is great.In 2014y. is increased microbiological failure and number of intestinal infectious diseases.It's necessary regular disinfection.

Keywords: Disinfection,rural water supply,morbidity

4. THE QUALITY OF DRINKING WATER IN SCHOOLS IN RURAL AREAS IN THE MUNICIPALITY OF KUMANOVO FOR THE PERIOD 2012-2014

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Objectives: to evaluate drinkig water, sanitation and hygiene conditions in schools in rural areas.

Materials and methods: Testing the quality of drinking water from public objects for water supply is carried out under the program for preventive health care. This covers all school buildings in the rural area of the municipality of Kumanovo. Samples for analysis were taken on the fountain in the school buildings. Laboratory analyzes are within the limits of the basic microbiological and physicochemical parameters. Residual disinfectant was determined by on-site sampling. Sanitary and hygienic inspection of facilities for water supply and hygiene conditions in the schools are determined,

Results: Drinking water supply in schools in rural areas in the municipality of Kumanovo is through local rural water supply or from its own building. In the period from 2012 to 2014 were examined 378 samples of drinking water in schools in rural areas. Of these, 17.5 % does not fit in relation to the microbiological quality, and in 39 samples of the proven presence of bacteria Escherichia coli. In relation to the physicochemical parameters are incorrect 129 samples or 34.1%. In 123 samples of water were proved by the increased concentration of nitrates. In any instance of the test water, has not been proven residual disinfectant.

Conclusion: Drinking-water supply to school should meet national standards and follow WHO guidelines. In practice, this means that sources for water supply must be protected and should be carried out continuously disinfect water.

Key words: drinkig water, Escherichia coli

5. NICKEL IN TATTOO AND PERMANENT MAKE-UP INKS AND HEALTH RISK

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Tattooing practice is adopted worldwide and represents an important socio-cultural phenomenon. However, the injection of coloring agents into the skin might cause adverse health effects due to: hygiene of tattoo studios, tattoo artists skills, impurities in tattoo inks, health condition of tattooed person, aftercare. Medical complications are dominated by dermatological reactions.

Objective: The aim of this paper is to put emphasis upon the influence of different methods of preparation of inks for determination of metals on the obtained results. Study included inks samples, analysed on Ni, following two methods of sample preparation: microwave oven decomposition with strong acids, and extraction with artificial perspiration solution.

Materials and methods: Analytical method including microwave preparation revealed presence of nickel in all samples, in concentration ranging from 1.2 to 48.2 mg/kg, while preparation by extraction resulted with no quantifiable quantities of nickel.

Results: Legal limit for nickel content in inks is not established, but if safe allergological limit of 1 mg/kg is considered, all analysed samples might pose a risk for the development of dermatological reactions. However, based on extraction method, all samples would be considered as safe.

Conclusion: European Resolution ResAP(2008)1 describes maximum allowed concentration of nickel as low as technically achievable, with no recommended method of determination.

This report urges that authorities regulate toxic and allergologically relevant metals in tattoo products and to avoid this ambiguity, it is necessary to agree upon appropriate analytical methods.

Key words: nickel, tattoo, complications

6. GEOGRAPHIC INFORMATION SYSTEM IN MAPPING RECREATIONAL WATER

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Objective: The quality ofrecreational watersaffects human health.Scopeof pollutantsentering therecreationalwatercomes frommany sources.Geographic Information System(GIS) is a powerful tool for displayingand analyzing spatialinformationpertaining towater quality. In the paper will be presented to use of GIS in mapping public baths for surface water which is used for recreation, and physical-chemical and microbiological deficiency surface water that has been used for recreation in 2012 and in e 3 seasons (2010-2012).
Materials and Methods: Geographic Information System (GIS) was used to map the data of the Institute of Public Health of Serbia “Dr Milan Jovanović Batut” on health safety of surface waters, which have been used for recreational purposes in the Republic of Serbia in 2012 and in the previous three seasons (2010-2012. year).
Results: Thematic maps show thesafety ofsurface waters,which have been usedfor recreational purposesin the Republic ofSerbiain 2012 andinthe previousthree seasons(2010-2012.).
Conclusion: Mapping environmental and recreational places for swimming is important because maps may help to identify environmental problems and the status of water recreation, and point to the locations that need further study in the future

Key words:geographic information system (GIS), recreational water, quality water, mapping

7. NOISE IN THE PUBLIC SWIMMING AREAS

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Objective: During the summer of 2014, IPHV was participated in the project testing the hazard to human health, there was examined noise exposure of people in public swimming areas (PSA) in the province of Vojvodina.

Methods: In total, according to legal basis and standardized / accredited methodology, there were performed 30 24-hour noise measurements in 5 popular PSA on the Danube river: Novi Sad (Strand), Apatin, Futog and Begec, also in "Tikvara" lake, Backa Palanka.

Results: According to national normatives for "resting and recreation areas", daily noise indicator (L_{day}) was increased in 63% (ranged from 40,6 dB(A) to 68,4 dB(A)), evening noise indicator ($L_{evening}$) in 60% (ranged from 40,3 dB(A) to 69,4 dB(A)), and night noise indicator (L_{night}) in 87% (ranged from 35,4 dB(A) to 61,0 dB(A)) of measurements. Total noise indicator (L_{den}) ranged from 46,1dB(A) to 67,0 dB(A).

Conclusion: As expected, the noise in PSA is lower than the noise areas of Novi Sad (resting and recreation areas, residential areas, city centre and city street zones, industrial areas). Also, in PSA there were different noise sources / frequency structure of noise. These are the first 24-hour noise measurements in PSA in Vojvodina, and the future research will show quantity of risk.

Keywords: Noise, health, hazard, indicator

8. RISK FACTORS ASSOCIATED WITH ONYCHOMYCOSIS

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Background: Onychomycosis is a fungal infection of one or more nails.

Objective: The objective of this work was to investigate the role of risk factors in etiopathogenesis of onychomycosis of the feet. We studied the following risk factors: trauma of the nail, wearing closed tight shoes, excessive sweating, sports, possession of an animal, contact with soil, the existence of onychomycosis in family, diabetes, compromised peripheral circulation, psoriasis, immunosuppression.

Material and Methods: The study included 160 patients from two institutions at the territory of Belgrade and Nis, with a clear clinical suspicion of onychomycosis. The control group consisted of 160 patients with no signs of onychomycosis. Patients completed a questionnaire, and data were analyzed by descriptive statistical analysis.

Results: Increased sweating exists in 55% of patients in Belgrade and 50% patients in Nis, with confirmed onychomycosis. In the control group patients from Niš, 89% of them do not had sweating feet, compared with 63% of the patients in Belgrade. Onychomycosis was confirmed in 52.17% of the respodents from Nis, which often carry a closed, tight shoes, and 52% of them stated that the trauma preceded the occurrence of fungal nail infections. In the control group we found 80% of patients who have never had the trauma of the nail and 55% patients who often wear tight closed shoes. Respondents in both territories had a high percentage of recurrence of onychomycosis,70.53% of the patients in Belgrade, and 73.91% of the patients from Nis.

Conclusion: Knowing the risk factors makes a significant contribution to the prevention and inhibition of recurrence of onychomycosis. In this study, we find that the increased sweating, nail trauma and previous fungal infection were important factors in etiopathogenesis of onychomycosis feet.

Key words: risk, onychomycosis, nails

9. ASSESSMENT OF EXPOSURE TO ENVIRONMENTAL NOISE KICEVO THE POPULATION IN URBAN ENVIRONMENT FROM 2005- 2014.

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Objective:To assess exposure to environmental noise among the population in urban areas(c.Kicevo) and propose appropriate preventive measures to reduce the level of environmental noise,which adversely affects the health.

Material and Methods: Selected 7 measuring points in Kicevo and modern camera company test model 815 with the ability to detect noise from 30-130 decibels.Measurements were performed in 2005y-20014y in traffic,residential,health,school and other zones.Results are shown in tables and graphics.

Results: We must emphasize the fact that every day the measured values of noise in 2005y. according to the norms of S.Z.O.are higher in all locations (from 350 measurements over MDNB are 287 or 82%).The annual average Leq(A)was 70.2 dB and is 17% above MDNB.Conducted a total of 8,400 measurements 2012y.-2014y.can be concluded that the limit values for the main indicators for average noise are reduced and due-day average (measured 4 times a day in the fall and spring)and location away from intersections.

Conclusion: Because of the situation determined to overcome the norms stipulated by the "Regulations for limits on the noise level of the environment"(P.P of RM No.120/08)some measuring points are in a need for recommendations for reduction the level of environmental noise, which adversely affects the health of the population.

Key words:noise pollution,monitoring, prevention.

10. EPIDEMIOLOGICAL CHARACTERISTICS OF SCOLIOSIS IN SCHOOL CHILDREN IN THE TERRITORY OF THESOUTH BAČKA COUNTY OF VOJVODINA

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ObjectiveThe aim of the epidemiological investigation was to analyze the characteristics of scoliosis in school children, aged 7-19 years in the Southern Bačka region in 2013.

MethodsDescriptive epidemiological method was applied. Data from regular examination of children, primary and secondary schools in the South Bačka County, collected from a total of 11 health centres of the territory and processed in a report for school children and youth services Social Medicine Institute for Public Health of Vojvodina.

Results The prevalence of scoliosis in elementary and secondary schools in 2013 in the territory of the South Bačka County was 8.0% and was twice higher among high school students (13.2%), compared to students from elementary schools (6.2%). The prevalence of scoliosis in elementary and secondary schools in relation to gender, is not significantly different, the relation of boys and girls was 1.1: 1.0. A moderate form of the deformity is nine times more registered compared with strong deformities among students diagnosed with scoliosis (9:1).

ConclusionIt is necessary to focus attention on preventive medical check-ups of children in this age group in order to implement corrective methods in a reversible stage of the process.

Keywords: scoliosis, children, school

11. ANALYSIS OF CONCENTRATION LEVELS OF AIR POLLUTATIONS IN NORTH KOSOVSKA MITROVICA

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Introduction: Pollutant means any substance present in the air, which has harmful effects on human health and the environment. The type and composition of pollutants depend on the type of pollution sources and technological processes that are going on in it. Sources of pollutants make the products of fuel combustion in households, heating plants, individual furnaces, traffic, uncontrolled landfills, etc.

Objectives: To analyze data on concentrations of pollutants (SO_2, NO_2 and soot) with regard to seasonal variation and identification of possible dominant sources of pollution.

Methods: In the period since 2009. to 2013., the immission of SO_2, NO_2 and soot was monitored at Kosovska Mitrovica. The concentration of SO_2 and NO_2 was determined by spectrophotometry - pararosylin method (TSMF), while the concentration of soot determined by reflectometric method. Statistical hypotheses were tested at statistical significance level of 0.05.

Results: Over the test period were recorded in excess of limit values of 50 μ/m^3 for soot ($p<0.001$), with the highest overachievement in 2011. (123 days) and participation exceeding 100% in the winter. The concentrations of SO_2 and NO_2 limit values are not exceeded during the test period. Median concentrations of soot in the winter season was 19.6 (range, 0.4 to 474.9), while in the summer season was 11.6 (range, 0.4 to 87.4), a statistically significant difference ($p<0.001$). Unlike the carbon black concentration of SO_2 and NO_2 were not significantly changed compared to the season.

Conlusion: Maximum concentrations were observed in the winter period, probably due to the presence of additional emission sources (individual furnaces). Seasonal variations are expressed only at the soot.

Key words: air pollutions, sulfur dioxide, nitrogen dioxide, soot.

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12. THE EFFECTS OF OCCUPATIONAL EXPOSURE TO ZINC IN METAL INDUSTRY

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Objectives: The main sources of occupational exposure to zinc in metal industry are: casting, welding, smelting, rolling and electrolysis of zinc, its alloys and compounds, which enables simultaneous exposure and other metals (cadmium, arsenic, manganese, lead, etc.), which all brought on the need to study its potential toxic effects. The significant increase of zinc in the human body can lead to a disturbance in neurological functions, to irritant effects on mucous membranes of the eyes and upper respiratory tract, and skin, with possible sensitization in the form of chronic eczema, we performed the statistical analysis of the association of age and length of service and zinc concentrations.

Materials and methods: We used the data from the annual reports of social services and medical statistics, medical records of the professional primary and specific health care and expert findings of the Public Health Institute in Nis. The concentration of zinc in biological samples was determined by spectrophotometric methods. The statistical analysis of results was performed using software packages Excel, Matlab and SPSS19.0.

Results: The level of zinc in serum and urine of exposed groups during the study period was positively correlated with the age ($r=0,752$, $p<0,01$ and $r=0,843$, $p<0,01$ respectively). The correlation is high and positive, which indicates the significance of the connection. The high correlation between the concentration of zinc in serum and urine and the exposed length of service in exposed subjects during the time of study was also determined, ($r=0,537$, $p<0,01$ and $r=0,593$, $p<0,01$, respectively).

Conclusion: A retrospective cohort epidemiological study showed that the systematic effects of zinc exposure result in an increase of its concentration in biological material, but zinc intoxication has not been established within this research. The level of zinc in serum and urine of the exposed group during the study period was positively correlated with the age, and the exposed length of service. These data confirm the association between the occupational exposure to zinc as well as the age and length of exposed service.

Key words: zinc, occupational exposure, toxic effects, metal industry.

13. THE NECESSITY OF INTRODUCING A SYSTEMATIC SOIL MONITORING FOR FOOD SAFETY

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The objective of quality control is the identification of sensitive land and burdened areas, development of a database on the extent and characteristics of pollution, as well as the types of pollutants present. Local pollution is represented in areas of intensive industrial activity, inadequate landfills, as well as in places of chemical accidents. Improper disposal and accidental release of toxic and hazardous substances, mainly due to agricultural and industrial activities, leading to pollution of soil. Due to these activities the land be greatly polluted by heavy metals, which are toxic and can not be destroyed, but only converted into forms that are not available organisms.

Monitoring and reporting on the quality of the land, as prescribed by the Law on Environmental Protection (Off. Gazette of RS, 135/04 and 36/09), the Regulation on the program of systematic monitoring of soil quality indicators for assessing the risk of soil degradation and methodology for development of remediation programs (Off. Gazette of RS 88/2010), the Regulations on permitted amounts of hazardous and harmful substances in soil and water for irrigation and methods of their testing (Off. Gazette of the RS 23/94) and the Regulation on the keeping of information systems for environmental protection, methodology, structure, common bases, categories and levels of data collection, as well as the content information on which the regular mandatory to inform the public (Fig. Gazette of the RS 112/09) The laboratory tests were performed at the laboratory of the Centre for Hygiene and Human Ecology, Institute of Public Health Niš, based on recognized methods and testing procedures

Conclusion: Without knowing the zero state land with five locations around the flooded areas of New villages in the space of two months, were carried out analysis of hazardous and noxious substances in agricultural land. Analyses have shown elevated concentrations of copper, nickel and arsenic

Key words: land, heavy metals, testing

14. ANALYSIS OF MORBIDITY OF THE RESPIRATORY AND DIGESTIVE SYSTEM IN WORKERS EXPOSED TO MERCURY VAPOR

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In the Zupa chemical industry,a series of abiotic factors that pollute the atmosphere are formed as a part of the technological process,including a certain concentration of mercury vapors.The aim of the study was to examine the effects of mercury vapors on the respiratory and digestive systems of the exposed workers.

Objective: Our study included 475 male workers of Zupa.Their health condition was checked three times during the research.All the subjects were divided in three groups according to exposure to the mercury vapors (regularly exposed 103,sporadically exposed 237,previously exposed 135.

Results: Having compared the frequency differences between the groups with different exposure levels (among the subjects with respiratory diseases) we have determined that the statistical difference between the group of regularly exposed and all the other groups was $p<0,05$.Our results have shown that as far as the frequency of subjects with digestive diseases is concerned there is a statistically significant difference of $p<0,05$ between the group of regularly exposed and all the other groups.

The results of our study are worrying, and they point to adverse effects of mercury on the health of the workers professionally exposed to its vapors.

Key words: mercury vapors, exposed workers

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HEALTH PROMOTION SESSION

Topic: HEALTH PROMOTION IN VULNERABLE POPULATION

INVITED LECTURES

1. HEALTH PROMOTION AND DISEASE PREVENTION IN REPUBLIC OF SRPSKA

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Abstract

Cardiovascular disease (CVD), of which the most common is the coronary heart disease, is a major cause of death in middle-aged people and elderly population in the Republic of Srpska. The development of coronary heart disease is largely associated with improper lifestyle. There is abundant scientific evidence showing that the lifestyle modification, and reduction of risk factors, may hold back the development of coronary artery disease, thus significantly reducing the morbidity and mortality. The results of these studies formed the basis for the development of the Strategy for Health in the Republic of Srpska to 2010 and the Program for prevention and control of non-communicable diseases of the Ministry of Health and Social Protection of the Republic of Srpska, which focuses on the detection, measurement and reduction of: high blood pressure, elevated cholesterol levels in blood, elevated blood glucose level in blood, increased body mass index and smoking, as well as screening and early detection of the cancers of the breast, cervix, prostate and colon. In order to achieve the objectives of the Program, the measures taken are aimed at the whole population (Population Strategy) and at individuals and families at high risk (high-risk strategy). The family physician has a very important role in preventing cardiovascular disease. His role is complex and requires careful management of time and financial resources dedicated to a registered patient. Strong primary health care, with development of family / general medicine is the foundation for effective implementation of programs of health promotion and disease prevention.

Key words: health promotion, prevention, family medicine

Introduction

Cardiovascular diseases (CVD), of which the most common is the coronary heart disease, are the major cause of death in middle-aged and elderly population in most European countries (1). One of the eight men and one of seventeen women die from CVD before the age of 65. There is a difference in premature mortality even up to 10 times between Western Europe and countries in Central and Eastern Europe, with the highest rate of mortality in the East. Mortality from CVD declined by 2% per year in Western countries, and increased by 6% in Eastern, and in some parts of Central Europe. In the Republic of Srpska, according to data provided by the Republic's Statistics Agency the mortality in 1998 was 53.4%, in 1999 54.5%, 2000 53.9%, 2002 53.4%, 2003 52.9%, 2004. 53.4%, 2005 49.4%, 2006 47.5%, 2007 50.4%, 2008 51.3%, 2009 51.1%, and in 2010 was 50%. According to the Institute for Health Protection of the Republic of Srpska, in 1999 outpatient morbidity was 8.4%, 13% in hospitals, while the morbidity rate among the population aged 18-65 years accounted to 15.6% (2).

The development of coronary heart disease is largely associated with improper lifestyle. There is scientific evidence that modification of the lifestyle and reduction of risk factors may impair the development of coronary artery disease, and significantly reduce the morbidity and mortality (3,4,5).

Studies conducted among the population of the Republic of Srpska, conducted on a representative sample of the adult population 18 years and over (the project "Public health and disease control", 2002), have shown a high degree of vulnerability of the population and pointed out the need for control and prevention of cardiovascular disease (6).

The results of this study formed the basis for the development of the Strategy for Health in the Republic of Srpska up to 2010, which was adopted by the National Assembly in 2002, and the Program for prevention and control of non-communicable diseases of the Ministry of Health and Social Welfare. The overall objective of the Strategy is to halt the growth of mortality and disability morbidideta of the leading non-communicable diseases (cardiovascular diseases, breast cancers, cervix, prostate, and colon). Specific objectives related to cardiovascular disease are:

1. Reduce mortality from cardiovascular disease in people younger than 65 by 10%,
2. Recrease complications caused by diabetes by 20%,
3. Reduce the number of adult smokers by 50% and the number of young smokers 80% and
4. Reduce the number of people who regularly drink alcohol for at least 50%, and among young people by at least 80% (6).

To achieve these goals, a number of measures were aimed at the whole population (Population Strategy), at individuals, and families at high risk (high-risk strategy).

Prevention measures aimed at individuals within the jurisdiction of family medicine teams and include:

1. Health-promotion measures, aimed at reducing preventable risks through consultation in contact with a doctor or nurse on the team,
2. Detection and reduction of risk factors in accordance with the Prevention Programme and
3. Early detection of the disease and treatment.

The program for prevention and control of non-communicable diseases determines in detail the manner of realization of routine prevention of cardiovascular disease from a medical point of view, and thereby defines the dynamics of the review, the criteria for defining the target groups, procedures for determining the existence of risk factors and the services responsible for conducting the review. It is in implementation phase since 2004 in 53 health centers (6).

As far as the implementation is concerned, the Institute of Public Health of the Republic of Srpska shall monitor and evaluate the implementation of the Program, through which it will have established a system to monitor the relevant health risk factors, evaluates the impact of the implementation of the program, creating a database in order to compare the situation and changes in the period of execution of the program, and determine the number of residents with a potential risk factor for cardiovascular disease for each subsequent year (7).

Detection and reduction of risk factors for cardiovascular disease in family medicine

Cardiovascular disease is influenced by many "upstream" factors (food production, access to a safe environment that encourages physical activity and access to education) and "downstream" behavioral factors. In approximately 90% of cases, the risk of first myocardial infarction is associated with nine potentially modifiable risk factors: smoking, improper diet, insufficient physical activity, obesity / overweight, diabetes, psychosocial stress, alcohol consumption and elevated cholesterol levels in the blood (8).

Primary health care has an important role in the detection, treatment and monitoring of the described risk factors. As a result, many European countries have structured programs to improve the prevention and management of risk, such as educational proactive visits in the Netherlands, the management of diseases in

Germany and incentive contract based on the indicators in the UK. Other countries, such as Belgium and France have local and regional projects to improve quality.

Patients with confirmed diagnosis of one of the non communicable diseases (e.g., cardiovascular) and with a present risks for other non communicable diseases (e.g., diabetes) which are followed and offered counselling (life style, diet) should be registered as control examinations done within the framework of non communicable diseases prevention services.
The Program for prevention and control of cardiovascular diseases in the Republic of Srpska focuses on the detection, measurement and reduction of the following cardiovascular risk factors in family medicine: high blood pressure, elevated cholesterol levels, elevated blood glucose level in the blood, elevated body mass index and smoking (6,7). Total cardiovascular risk is calculated by using tables in accordance with the Systematic Coronary Risk Evaluation- SCORE of the European Society of Cardiology, and on that basis a decision on intervention for each individual risk factor is made.

High blood pressure.

In 2003, arterial hypertension was registered in 42.1% of the population of the Republic of Srpska (9). This disease represents a significant burden to society, because it is estimated that almost a billion inhabitants in the world have arterial hypertension (10). In the next 20 years, cardiovascular disease will be the leading cause of morbidity and mortality, and therefore the amount of funds that have to be invested in prevention justify the increased interest in assessing the cost-effectiveness of prevention interventions.

Recent studies have shown that hypertension can be prevented by applying population strategy or strategies aimed at high-risk individuals and groups who have an increased risk of hypertension. The potential benefits relate to a reduced morbidity and mortality: an analysis based on the study of risk factors for cardiovascular disease, which began 1948, and follows the three generations in Franimgham (Framingham Heart Study) showed that the decrease in the average diastolic blood pressure by 2 mm Hg in population of 35-64 years of age, lead to a reduction in the prevalence of hypertension by 17%, the risk of stroke by 14% and the risk of heart disease by 6% (11).

The family physicians measure arterial blood pressure to every individual from the age of 18 at least once every 2 years, and to people older than 65 years at least once a year. If during the first measurement elevated blood pressure is found, measurement is repeated at least three times in the next six months, and if diagnosis of arterial hypertension isconfirmed, the patient is admitted into a Registry for high blood pressure. Treating high blood pressure is conducted as part of an overall cardiovascular risk in accordance with the recommendations of the National clinical guidelines for hypertension (12).

Elevated cholesterol levels in the blood

Fifty-five percent of the population in the Republic of Srpska has elevated cholesterol levels, according to the research from 2002 (6).

The level of total cholesterol is measured in people with elevated blood pressure or body mass index greater than 30. If elevated levels of total cholesterol are detected, the values of LDL-cholesterol and HDL-cholesterol are analyzed, and then the overall cardiovascular risk is assessed according to SCORE tables, whose values determine the further approach in treating hyperlipoproteinemia (13).

High glucose levels in blood

Research shows that 14% of the population in the Republic of Srpska is suffering from diabetes (6). According to the program of prevention, measurement of blood glucose is performed in patients with elevated blood pressure, body mass index over 30, and a family history. If the blood glucose level is higher

than7 mmol/l, then further diagnostic tests and assessment are conducted in accordance with the recommendations of the National clinical guide for diabetes (14).

Higher body mass index

Overweight and abdominal obesity are associated with many adverse metabolic disorders: low HDL-cholesterol, high triglycerides, impaired glucose tolerance, insulin resistance and diabetes, as well as overall mortality. These metabolic disorders tend to cluster among obese patients and create metabolic syndrome.

Obesity and overweight are determined by body mass index (BMI). According to the Program of prevention, a nurse or a family physician should measure the BMI for people older than 18 years on the first visit. Patients with a BMI ≥ 30 kg / m2 are introduced in the Registry. The guide, however, does not define the procedure for patients with obesity in the range (BMI ≥ 25 and <30 kg / m 2).

The program does not include the evaluation of prevention of abdominal obesity, which is a separate risk factor for cardiovascular diseases and whose visceral component, as an endocrine organ, plays an important role in cardiovascular homeostasis (15). A small percentage of Family Medicine in the Republic of Srpska uses the abdomen, the hips and their relationship as indicators of abdominal obesity.

Counselling about diet and physical activity, as well as obesity treatment are done following the Guidelines for adequate nutrition for health care professionals (16) and Guidelines „Enjoy in food and be active “ produced by the Institute for Public Health of RS (17).

In practice, the measures taken are often not effective because patients are not motivated enough to change habits or not linking their behavior to the risk of developing disease in the future. On the other hand, a low standard of living, a large number of patients, the lack of standardization in primary health care and the impossibility of planning outcomes deter doctors to explore the context of the personality of the patient, the situation in the family, workplace, or other characteristics, which are very important to analyze and solve problems arising during the process of prevention, which prevents the sustainability plan of intervention and monitoring of the patient (7, 18).

Smoking

The study from 2002 established that active smokers account for 34% of the population in the Republic of Srpska, with 50% of men and 30% women. Secondhand smoke exposure is 80% of children aged 13-15 years, and 60% of adults (7,19,20).

In the Republic of Srpska there is a law prohibiting smoking in enclosed public places, as well as laws that prohibit advertising tobacco products in all media and sale of tobacco products to persons under 18 years of age, but only since 2011, a way of punishing the offender was established. Unfortunately, the law prohibiting smoking in enclosed spaces is often not observed.

For smokers, the intervention aimed at giving up smoking is done following the Guidelines for cessation of smoking (21).

Changing behaviors related to smoking cessation is one of the most important measures for the prevention of cardiovascular disease. Any person on the first visit to the family medicine clinic is asked about smoking (if yes for how long and how many cigarettes a day). Smokers get professional support to permanently stop smoking all forms of tobacco. Minimal interventions last up to three minutes and include counseling on smoking cessation and a simple written material. Most of the family medicine teams in the RS have completed training in motivational techniques for smoking cessation (22).

Early detection of malignant diseases

Examinations and tests aimed at early detection of malignant diseases are:
1. Papa smear analysis for women between 25 and 60 years, once in 3 years

2. Breast palpation for women above 40 years, with every examination

3. Mammography for women between 50 and 70 years - once in 2 years

4. Digital-rectal examination for men between 50 and 70 years, once in 2 years – prostate cancer prevention

5. Digital-rectal examination for population above 50 years, once in 3 years –prevention of colon cancer

6. Stool sample test on occult bleeding for population above 50, once in 2 years

The realization of measures are beeing evaluated in both process and results by Public Health Institute of RS. The Institute submits regular quarterly reports to the Ministry of Health and Social Welfare of Republic of Srpska and to the Health Insurance Fund of Republic of Srpska (7).

Discussion
Analysis of the effectiveness of prevention programs in different European countries has shown that countries with underdeveloped primary care usually implement prevention programs aimed at the problem, and modification of lifestyle. Such programs in most cases lack adequate infrastructure and a holistic approach to the patient, which are essential to achieve good results in the treatment of cardiovascular disease. On the other hand, a strong primary health care system has a significant impact on improving the quality of care of patients with cardiovascular and malignant disease and provides opportunities encompassing relevant target groups in advising on lifestyle.

Although studies have demonstrated their high impact on morbidity and mortality, programs to improve lifestyle are globally underrepresented; the implementation of prevention programs in the countries of Eastern Europe are often accompanied by generalization and application of results from other countries with a higher level of development and better resources. Implementing a successful program certainly requires a systematic approach to planning programs within the national context, the assessment by an expert team focused on the available capacity of health workers, the target population and the health system, and the implementation of specific interventions in response to local needs and conditions (22).

In order to analyze the achieved results of the Program for prevention and control of non-communicable diseases, the Institute of Economics in Banja Luka conducted the first survey in 2006. In doing so, they sought answers to questions:

- does the program have a broad scope,
- is the consciousness of citizens of the Republic of Srpska at a low level, on the importance and usefulness of the control and prevention of non-communicable diseases and the program itself,
- is the implementation of the program more difficult due to inadequate and unrealistic models of financing?

In addition to the introduction and description of the background of the problem, the study contained the seven thematic units relating to:

- a description of the Program, subject and structure of the research, presentation of analytical methods of economic analysis of the effectiveness of prevention,
- a review of literature that addresses the issue of cost-effectiveness in other countries,
- the results of the program implementation in the Republic of Srpska,
- assessment of identified problems in the implementation of the Programme and the proposal for their resolution.

This concept of the studies gave enough space to objectively address the problems in the implementation of the Program for prevention and control of non-communicable diseases in the Republic of Srpska and propose specific policies to address them, taking into account the experiences and results of other countries in dealing with similar issues.

The most important issues are summarized over the next few conclusions. The way funding is not adequate for the successful implementation of the program, especially for uninsured citizens. Health Insurance Fund of the Republic of Srpska collects finances from people with health insurance, which is in the RS 70-80% of the total estimated population. From these funds, the Fund must finance curative care and try to finance also a preventive health care. Health centers receive finances only for insured persons, but they are obliged to provide health care for all citizens. On the other hand, a positive finding of this study is that the majority of citizens are aware of the importance of the concept of preventive care, and are willing to learn about the availability of preventive services.

Coordination and cooperation between the primary and secondary levels of healthcare in the Program are quite poor, with a very little information and interest of doctors at the secondary level on the importance of the elements of the program implementation.

The electronic health record that exists in this area mainly consists of unstructured text that is useful only in a small number of healthcare provisions. There is no possibility of extracting relevant information for making a decision about the care of patients in a quick and efficient way. Certain adjustments should be made in monitoring the implementation of the Program, in order to ensure sufficient quantity and quality of data for the relevant evaluation of the program, particularly from the point of application of the cost-benefit analysis for patients, analyses of costs against success of intervention (cost-effectivess analysis).

The stronger promotion strategy of Population Programme, the resolution of the key preconditions for successful implementation of the Programme, particularly in terms of organization of health centers that can provide high-quality service to all citizens who respond to and availability of adequate funding from the Program services are needed (24).

The interventions on a number of levels might decrease the incidence of risk factors. Although interventions focused on changing individual behavior dominated in recent years, changes at population level have the greatest overall benefit. Such changes can be achieved through "upstream" interventions, such as national or regional policies, legislation and activities aimed at improving the social, physical and biological environment.

Improving primary health care, in particular increasing the number of family practices or reducing the number of patients per team of family medicine, when doctors will have more time to devote to motivating patients to change their lifestyle, and the inclusion of additional staff in the prevention program, could increase the feasibility of providing behavioral interventions on a large scale. Policy makers need to consider how they can create the conditions for the provision of preventive services in primary health care.

Conclusion

The family doctor has a very important role in preventing cardiovascular and malignant diseases. His role is complex and requires careful management of time and financial resources provided to a registered patient. Population strategies have the greatest impact on changing the behavior of the population. Strong primary health care, with developed family / general medicine is the foundation for an effective impltementation of health promotion programs and disease prevention

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2. DEVELOPING PROGRAMS FOR HEALTH PROMOTION IN VULNERABLE POPULATION

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ABSTRACT

Health promotion, conceived as a strategy for the implementation of a new concept of public health, and then to achieved the objectives of the World Health Organization program "Health for All by 2000," over the last thirty years has emerged as a new way of thinking about the causes of health and illness. That has prompted new approaches to improve the health of individuals and communities, which can be seen through the concept of primary health care promoted in Alma Ata (1978). Further development in this area has led to the First Conference on Health Promotion, held in Ottawa, Canada in 1986, when was made famous "Ottawa Charter" in which health promotion is defined as " the process of enabling people to increase control over, and to improve, their health" It particularly emphasizes the empowerment of individuals and communities. The Charter is stressed three basic stragies for health promotion: advocacy; enabling and mediation. Then, emphasized five different areas of activity: building healthy public policy, create the environment that provides support, strengthening community actions, developing personal skills and reorientation of health services. As the most important values of health promotion are: the empowerment; social justice and fairness; inclusions and respect. Among the most important principles underlying health promotion activities are: the active involvement of the population in its everyday environment; orientation towards determinants of health; the use of several different approaches; participation community and the important role of health professionals in health promotion.
Vulnerable (sensitive) social groups are groups of people who, due to specific differences in relation to the dominant population, need extra support in order to, in a way that suits their abilities and development potentials, could be equal in a normal living community. The Law of Health Care are defined particularly vulnerable population groups that are health care funds allocated from the budget of the Republic of Serbia: Children under 15 years of age, school children, students by the end of the prescribed training; women in relation to family planning, during pregnancy, childbirth and motherhood; older than 65 years; Roma population; persons with disabilities: persons who suffer from the disease greater of social and medical importance: infectious diseases (HIV / AIDS, hepatitis B and C), malignant diseases, diabetes, multiple sclerosis, psychosis; unemployed registered with the employment, users of permanent financial assistance, disabled war veterans. There are a number of strategies which Republic of Serbia is trying to improve the situation of vulnerable groups.
Health promotion programs designed to vulnerable groups are adapted to nature of vulnerability or their health needs. Usually start with recording basics, ie. identifying health needs, followed by their analysis and determining priorities. Then follows the planning of the program, including the definition of goals and objectives and resources. The next step is the implementation of the program (organization, action plan, and management for the implementation of the program: who is responsible, what, where, how and when something is implemented) and monitoring processes. During the execution of the program, it is necessary all the time to conduct the evaluation, and control all steps in the program, and at the end applied evaluation of outcomes and results.
Key words: health promotion, vulnerable population, health programmes

INTRODUCTION

Health promotion, conceived as a strategy for the implementation of a new concept of public health, and then to achieved the objectives of the World Health Organization program "Health for All by 2000," over the

last thirty years has emerged as a new way of thinking about the causes of health and illness. That has prompted new approaches to improve the health of individuals and communities, which can be seen through the concept of primary health care promoted in Alma Ata (1978). Further development in this area has led to the First Conference on Health Promotion, held in Ottawa, Canada in 1986, when was made famous "Ottawa Charter" in which health promotion is defined as " the process of enabling people to increase control over, and to improve, their health" It particularly emphasizes the empowerment of individuals and communities. The Charter is stressed three basic stragies for health promotion: a) advocacy - good health is a major resource for social,economic and personal development and an important dimension of quality of life. Political,economic, social, cultural, environmental, behavioural and biological factors can all favour health or be harmful to it. Health promotion action aims at making these conditions favourable through advocacy for health.; b) enabling- Health promotion focuses on achieving equity in health. Health promotion action aims at reducing differences in current health status and ensuring equal opportunities and resources to enable all people to achieve their fullest health potential. This includes a secure foundation in a supportive environment, access to information, life skills and opportunities for making healthy choices. People cannot achieve their fullest health potential unless they are able to take control of those things which determine their health. This must apply equally to women and men. and c)mediation - The prerequisites and prospects for health cannot be ensured by the health sector alone. More importantly, health promotion demands coordinated action by all concerned: by governments, by health and other social and economic sectors, by nongovernmental and voluntary organization, by local authorities, by industry and by the media. People in all walks of life are involved as individuals, families and communities. Professional and social groups and health personnel have a major responsibility to mediate between differing interests in society for the pursuit of health. Health promotion strategies and programmes should be adapted to the local needs and possibilities of individual countries and regions to take into account differing social, cultural and economic systems.. Then, emphasized five different areas of activity: 1) building healthy public policy - health promotion goes beyond health care. It puts health on the agenda of policy makers in all sectors and at all levels, directing them to be aware of the health consequences of their decisions and to accept their responsibilities for health; 2) create the environment that provides support - our societies are complex and interrelated. Health cannot be separated from other goals. The inextricable links between people and their environment constitutes the basis for a socioecological approach to health. The overall guiding principle for the world, nations, regions and communities alike, is the need to encourage reciprocal maintenance - to take care of each other, our communities and our natural environment; 3) strengthening community actions - health promotion works through concrete and effective community action in setting priorities, making decisions, planning strategies and implementing them to achieve better health. At the heart of this process is the empowerment of communities - their ownership and control of their own endeavours and destinies; 4) developing personal skills - health promotion supports personal and social development through providing information, education for health, and enhancing life skills. By so doing, it increases the options available to people to exercise more control over their own health and over their environments, and to make choices conducive to health; 5) reorientation of health services -. The responsibility for health promotion in health services is shared among individuals, community groups, health professionals, health service institutions and governments. They must work together towards a health care system which contributes to the pursuit of health. The role of the health sector must move increasingly in a health promotion direction, beyond its responsibility for providing clinical and curative services. Health services need to embrace an expanded mandate which is sensitive and respects cultural needs. This mandate should support the needs of individuals and communities for a healthier life, and open channels between the health sector and broader social, political, economic and physical environmental components. As the most important values of health promotion are: the empowerment; social justice and fairness; inclusions and respect. Among the most important principles underlying health promotion activities are: the active involvement of the population in its everyday environment; orientation towards determinants of health; the use of several different approaches; participation community and the important role of health professionals in health promotion.

VULNERABLE GROUPS

Vulnerable (sensitive) social groups are groups of people who, due to specific differences in relation to the dominant population, need extra support in order to, in a way that suits their abilities and development potentials, could be equal in a normal living community. According to WHO "vulnerability is the degree to which a population, individual or organization is unable to anticipate, cope with, resist and recover from the impacts of disasters".

There is not universal, nor the final list of vulnerable social groups. Mainly for two reasons: 1) the specifics of which indicates the difference between members of vulnerable groups and members of the dominant population are not only physical and objective nature, but may also have mental and social basis, and often a combination of physical, mental and social. In various areas differences mental and social nature may have different interpretations; 2) Among the dominant population, there is often, a greater or lesser tendency to physical, mental and social specificities which do not understand as specifics, but such deficiency, mainly due to the generally accepted stereotypes and prejudices.

But, the Law of Health Care are defined particularly vulnerable population groups that are health care funds allocated from the budget of the Republic of Serbia: children under 15 years of age, school children, students by the end of the prescribed training; women in relation to family planning, during pregnancy, childbirth and motherhood; older than 65 years; Roma population; persons with disabilities: persons who suffer from the disease greater of social and medical importance: infectious diseases (HIV / AIDS, hepatitis B and C), malignant diseases, diabetes, multiple sclerosis, psychosis; unemployed registered with the employment, users of permanent financial assistance, disabled war veterans.

A number of vulnerable groups are likely to face difficulties in generating good incomes. These groups are especially likely to have a low level of education, be poorly integrated into the labor market, and own few assets. They may also face discrimination, which complicates their ability to generate independent incomes. In addition, each group faces problems specific to that group: the elderly may have declining health; people with disabilities face physical and social barriers to participation in society; the internally displaced may be restricted to certain areas or housing; former combatants may have mental health issues related to their war experiences and/or be shunned by communities; and immigrants may not have access to the full range of services, and if illegal or undocumented, may be hesitant to use those services that are provided.

LEGISLATIVE BASIS FOR PROTECTION AGAINST DISCRIMINATION

There are numerous laws and strategies which the Republic of Serbia is trying to improve the situation of vulnerable groups. In the Republic of Serbia is conducted extensive process of social, political and economic reforms. This also applies to the field of prevention and proscription of discrimination, which are made numerous and significant reforms with whom and in the future should continue. An important step in this area was made in March 2009, when the National Assembly of the Republic of Serbia adopted the Law on Proscription of Discrimination. In enacting this law, civilian (non-government) sector and individuals gave a great contribution, involved in the promotion, advancement and protection of human rights. This general anti-discrimination law was adopted almost three years after the first comprehensive anti-discrimination law in the Republic of Serbia, the Law on Prevention of Discrimination against Persons with Disabilities, in April 2006. As the first law in the region which deal exclusively with issues of preventing discrimination and ensuring equality of a sensitive social groups, the Law on Prevention of Discrimination against Persons with Disabilities is the first pioneering step in the fight against discrimination. Although in the period from 2000 to 2009 (until the adoption of the Law on proscription of discrimination) in the new legislation adopted provisions governing the protection against discrimination, for the successful struggle against the discrimination it was necessary to bring the system general law that would uniquely integrated and connect the diverse and often isolated individual legal norms contained in other, sectoral laws. The adoption of the Law on prohibition of discrimination has been made and this step, and the fight against discrimination has

received, after the establishment and commencement of the Institution of the Ombudsman in 2007, another independent body as a form of institutional forms of prevention of discrimination - the Commissioner for Protection of equality (CPE). Changes in regulations and the establishment of new institutions created conditions for the creation of a comprehensive legal and institutional environment in which conduct the fight against discrimination in a way that the state outlaws any discrimination, regardless of whether they are responsible for it its officials or its bodies or natural and legal persons.

HEALTH PROMOTION PROGRAMS

Health promotion programs designed to vulnerable groups are adapted to nature of vulnerability or their health needs. Usually start with recording basics, ie. identifying health needs, followed by their analysis and determining priorities. Then follows the planning of the program, including the definition of goals and objectives and resources. The next step is the implementation of the program (organization, action plan, and management for the implementation of the program: who is responsible, what, where, how and when something is implemented) and monitoring - monitoring processes. During the execution of the program, it is necessary all the time to conduct the evaluation, and control all steps in the program, and at the end applied evaluation of outcomes and results. When creating the program, it is necessary to apply an appropriate strategy of health promotion, custom of nature of vulnerable social groups, and then to work in all areas defined in the Ottawa Charter, in order to reach a desired outcome or to achieve specific goals. A particularly significant is cooperation with the community and individuals, working with individuals and not for them. Also, it is extremely important and cooperation, and the participation of other social systems, not only health system, such as educational, economic, legal, and so on.

In the Republic of Serbia was given significant attention from groups of vulnerable persons, is dedicated to promoting and preserving and improving the health of Roma. Based on the action plan for improving the health of Roma in 2008 and 2009 from budget line was spent 61 million dinars from 2006 to 2008. In the realization were participating health centers, Institutes of Public Health in cooperation with non-governmental Roma organizations. The main objectives were: improving health status and living conditions; Improving access and use of health services; increase awareness and knowledge about the rights of health care and health insurance; adopting a healthy lifestyle among the Roma population. Was carried out 103 projects in 60 municipalities in which 17,500 Roma were included as direct beneficiaries. Within the project were employs 40 mediators Roma. Government of Serbia in 2009 adopted a strategy to improve the position of Roma in Serbia and then an action plan to implement the strategy.

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ORAL PRESENTATIONS

1. „HEALTH FOR ALL“ - PROJECT OF THE ASSOCIATION OF PEOPLE'S HEALTH-ANDRIJA ŠTAMPAR

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Association of People's health Andrija Štampar has launched the project "Health for all" which is recognized by the Ministry of Health of the Republic of Croatia and was among the best rated.
Project is imbued with the idea that the person should not be seen solely through the prism of the disease and simplify to it, but that each person should be observed in the unity of his physical, mental, social and spiritual condition.
According the principles of Andrija Štampar, professionals should perform among the population not only in health care institutions. Educational and promotional activities among the general population to promote healthy lifestyles and the importance of health and disease prevention are also the goals.
The objectives are identification of health problems and dangers to public health, promoting healthy lifestyles and preventing and combating disease risk factors, reduction of social inequalities in health care and health promotion.
The importance of health promotion is not just the task of national and local health policies, institutions, professionals, but also of civil society organizations to strengthen the capacity to implement and some future programs and projects to promote and preserve health.
KEYWORDS: Association of people's health Andrija Štampar, Ministry of health Republic of Croatia, public health activities

2. THE ROLE AND IMPORTANCE OF HEALTH EDUCATION IN INCREASING THE FERTILITY RATE IN THE REPUBLIC OF SRPSKA

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Aim: The aim of this study was to compare the number of abortions per 1,000 live births in Republic of Srpska for a five-year period and to present the role and importance of health education in increasing the fertility rate.
Method: The data of Institute of Public Health Banjaluka and of the National Statistics Office were used for this study.
Results: In 2009 in the Republic of Srpska population growth rate stood -2.21 and -3.13 in 2013. In the Republic of Srpska and regions Banjaluka and Doboj in 2013 was observed reduction in the number of abortions per 1,000 live births compared to 2009 and increase compared to the year 2012. In the regions of Foča and Trebinje during the period from 2009 to 2013 can be seen a constant increase in this number, as well as in regions of Zvornik and East Sarajevo except in 2012. In the region of Bijeljina in 2012 and 2013 was observed reduction in the number of abortions per 1,000 live births.
Conclusion: Health education is very important. It is necessary to inform young people about modern methods of contraception, required spacing between births and sexually transmitted diseases.
Key words: population growth rate,abortion, fertility, health education

3. ROLE OF HEALTH PROMOTION IN THE PREVENTION OF SEXUALLY TRANSMITTED INFECTIONS AMONG STUDENTS

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[1]Public Health Institute Niš, Serbia
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Sexually transmitted diseases are widespread. Statistical data are often scarce, because a large number of diseases are not reported or patients are not responding to the physician.
The aim of study was to determine the knowledge and behavior of students in the field of protection against sexually transmitted diseases.
Methods: The study included 1180 students of the University of Nis. The instrument of data collection was anonymous structured questionnaire. The study sample was stratified with respect to college, age and gender.
Results: Knowledge of sexually transmitted infections among students in Nis is insufficient. Almost all the students knew about HIV (99.2%), more than 50% of students knew about syphilis, genital herpes, fungal infections and lice, 30% - 40% of students know about chlamydia, gonorrhea and genital warts, 10% know trichomonas, 5% knew about genital mycoplasmas. The highest level of knowledge had medical students and their level of knowledge was 17.5% higher than the level of knowledge of social science faculties and 19.2% higher than the level of knowledge of students naturally-technical faculty. Girls had significantly higher level of knowledge than young men, with the exception that this difference was greater in younger ($t = 4.951$, $p = 0.000$) than older students ($t = 4.005$, $p = 0.000$). Only 2.1% of students reported that they had had a sexually transmitted infection, most commonly genital warts and fungal infections. The condom as protection against sexually transmitted infections has used 74.4% of students (77% of boys and 57.8% girls).
Conclusion: Education of young people about sexually transmitted infections should be initiated as early as possible to reduce the number of patients, and preserve the reproductive health of young people.
Keywords: sexually transmitted diseases, students, knowledge, behavior

4. MENTAL HEALTH PROMOTION IN PREVENTION OF ANXIETY AMONG UNIVERSITY STUDENTS

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Objectives: Anxiety is one of the most prevalent mental health problems among university students, yet it is still under-reported, under-diagnosed and under-treated. This study aimed to create risk assesment anxiety model.
Materials and methods: A cross-sectional study, among 1.940 university students, was performed using a questionnaire that includes demographic and socioeconomic variables and Beck Anxiety Inventory.
Results: Results of multivariate logistic regression showed that female students (OR=1.901, 95% CI=1.490-2.425), environment pressure (OR =2.275, 95% CI=1.249-4.142) and students who reported parents high expectations of academic success (OR =1.290, 95% CI=1.022-1.630) were more likely to show anxiety symptoms. Demographic and socio-economic variables were used to create risk assesment anxiety model. This model focused on the central role of anxiety (the model outlined in this article) failed to predict the developmental risk of anxiety.
Conclusion: Our findings suggest a high prevalence of anxiety among university students. These results underscore the importance of mental health promotion, health education and early detections of mental problems.With the rise in stress and anxiety among college students, there is a need for comprehensive and effective counseling options for students in college counseling centers.

Key words: Anxiety, university students, mental health promotions

5. PREVALENCE OF GAMBLING HABIT AMONG SCHOOL CHILDREN IN NOVI SAD

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Aim: The aim of this study was to assess gambling prevalence among adolescents and their perception of gambling, in order to plan preventive strategies.
Methods: This cross-sectional study was conducted in April/May 2011 in 7 elementary and 7 secondary schools in the City of Novi Sad among 532 students aged 14-18 years using specially designed self-administrated anonymous questionnaire.
Results: There were 57.7% boys and 42.3% girls, average age was 15.52 years (SD=1.45). The majority (83.3%) are aware of having casino near their school (up to 500 m), mostly boys (p=0.017). Every fourth adolescent is regularly visiting casino predominantly boys (p>0.000). Adolescents mostly play on poker machines or practice sport betting. Averagely 5% showed some signs of pathological gambling (school drop-out, lying about time spent in casino, lack in ambition, borrowing money for gambling).
Conclusion: Gambling habit is present in one fourth of the polled adolescents, mostly boys. Considering that only 4.5% students claimed to have education about gambling in previous school year, it gave us justification to create workshops for adolescents in order to introduce them with dangers of gambling and to educate them for self evaluation of gambling addiction.

Key words: gambling, prevalence, adolescents

6. GENDER – RELATED DIFFERENCES IN ALCOHOL CONSUMPTION AMONG UNDERAGE YOUTH

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Objective: the aim of the study was to evaluate gender differences in alcohol abuse and to assess different attitudes of boys and girls towards alcohol.

Method: the survey enrolled 1340 respondents, 680 girls and 660 boys of the Niš region. A part of standardized survey NHTSA – National Highway Traffic safety Administration – was adjusted to young people in our country and used in the study.

Results: 90% of the respondents have tried alcohol, boys (94.7%) have used alcohol more than girls (85.8) (χ^2= 29.702; p<0.001). The average age of the first use of alcohol for girls is about 15 in comparison to boys who try alcohol at the age of 13. Greater amounts consumed within a few hours were reported in 61.6% of the respondents (more in boys – 72.9% - than in girls – 48.8% (χ^2=65.231; p<0.001)). The percentage of the young people riding in cars with drivers who had been drinking is 46.6%, slightly higher in boys than in girls (χ^2 = 6.16; p<0.005). The percentage of the respondents who reported driving under the influence of alcohol was 17.6%

Male respondents were four times more likely than females to report driving after drinking alcohol (χ^2=100.69; p<0.0001). 16.6% of respondents were absent from school due to alcohol consumption, two and a half-fold more boys than girls ((χ^2= 49.06; p<0.0001). 14.2% respondents were drunk at school classes (three times more boys than girls((χ^2= 58.48; p<0.0001)). Violent behaviour under the influence of alcohol was reported in 13.6% of respondents, seven and a half-fold more in boys than in girls (χ^2=100.69; p<0.0001). Injuries as a result of alcohol consumption were reported in 9.3% of respondents, male alcohol-related injuries were twice the number of female injuries (χ^2=20.35; p<0.0001). Family problems related to drinking alcohol were reported in 11.4% of respondents, two-fold more in boys than in girls (χ^2=12.28; p<0.01). Depression was reported as a more common reason for alcohol consumption in girls (64.2%) than in boys (58.7%) (χ^2=4.358; p<0.05). Insufficient information on hazardous alcohol effects was one of the most common reasons in increasing alcohol consumption reported by one third of the respondents (35.6%, 38.7% girls and 32.4% boys) (χ^2=5.71; p<0.05). Female respondents reported effective alcohol education of the young people in reducing alcohol consumption and the harms of alcohol abuse in higher percentage than males (40% respondents, 43.1% girls and 36.8% boys) and getting introduced to treated alcoholics experience (37.5% of respondents, 4.9% girls and 33.9% boys). Four out of ten young people (slightly more boys than girls) are aware of the peers with alcohol-related problems. Female respondents reported cafes as the most common location for juvenile alcohol abuse, while the male respondents indicated the homes of friends and relatives as the most common places for alcohol abuse.

Conclusion: The more successful health education treatment aimed at reducing youth drinking, should be focused on gaining knowledge about the health consequences of alcohol. It is necessary to include peer education, through activities in locations where young people learn, where they spend their free time, with the use of the media, the internet and telephone counseling services.

Key words: alcohol, young, behavior.

7. FACTORS THAT CONTRIBUTE TO BETTER HEALTH LITERACY OF WOMEN

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Introduction: Health literacy includes the cognitive and social skills which determine the motivation and ability of individuals to obtain,understand and use information in ways that promote and preserve good health. It enables people to increase control over their health and improve it.
Objectives: Study objective was to evaluate the health literacy in a population of tertiary health care patients in Gynecology and Obstetrics Clinic " Narodni front",and to identify factors associated with health literacy, and propose interventions in the field of health promotion for improving health literacy.
Material and methods: A cross sectional study was conducted. A total of 134 patients from Belgrade and other Serbian regions, were enrolled. The survey instrument was STOFHLA questionnaire (Short Test of Functional Health Literacy in Adults). An additional self-completed questionnaire covering sociodemographic data, economic status, self-perception of health, health system utilization, risk factors and knowledge about reproductive health was used. Data were analyzed using descriptive and inferencial statistics.
Results: Adequate level of health literacy was founded in 90.3% of patients, and inadequate at 9.7%. A better health literacy was present among younger patients. Education was statisticaly significant associated health literacy level. Risk taking behavior such as non-use of contraception and irregular check-ups, were not significantly associated with health literacy level.
Conclusion: Low health literacy may impair a patient's understanding of health messages and limit their ability to attend to their medical problems.Health literacy is more systematic than individual problem, so it requires a broader social action.
Key words: health literacy, womens, reproductive health

8. THE USE OF INTERNET BY ADOLESCENTS FOR THE PROTECTION OF SEXUAL AND REPRODUCTIVE HEALTH

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Electronic media have the leading influence in the early initiation of sexual life in adolescents. Information availability via Internet and social networks opens new possibilities in working with adolescents in the field of preserving and improving their sexual and reproductive health.

Goals: To determine to what extent adolescents use Internet in order to obtain information and certain knowledge regarding the protection of their sexual and reproductive health; to identify the differences among adolescents in using the internet to obtain information and knowledge about sexual and reproductive health protection.

Methodology: A study section has been used during this survey.

Sample: The sample consisted of 815 pupils of the 3rd and 4th grade of secondary schools in the territory of Nišava District.

Results: 15% of pupils state that they have frequent need for using internet in order to obtain information about sexual and reproductive health (21.8% pupils of gymnasium and 13.2% pupils of vocational school).

Conclusion: Adolescents use very little internet in order to get information and knowledge necessary for sexual and reproductive protection, where there is no gender distinction or age differences as well as differences related to respondents' origin. For getting the necessary information about sexual and reproductive health, adolescents who use internet quite often are pupils of gymnasium, older pupils, pupils of lower school success, and male pupils.

Key words: adolescents, sexual health, reproductive health

9. PREVENTION OFBEHAVIORAL DISORDERSAT THE COMMUNITY LEVEL

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Background: Epidemiological data indicate that 30% to 50% of young emerge a child psychiatrist because of behavioral problems. Studies protective factors that reduce the risk of behavioral disorders are just as important as the research of risk factors. The aim is to meet with preventive factors in the reduction of behavioral disorders including 4 domains: Individual, family, school and community. Emphasis is placed on preventive factors at the community level which makes national, state and local policy that supports programs oriented towards children and young people. Good infrastructure community support to young people to participate in activities where they have opportunities to make choices, make decisions and share responsibility. These experiences help young people to develop new skills, increase their confidence and make the difference, while such programs help adults to create a basis for understanding and working together with young and engaged people. Conclusion: The interest in the behavior of young people and their perspective creates the culture of care for youth instead of ignoring or even labeling deviant behavior among young people and antagonistic, which has a significant preventive effect on the development of conduct disorder.
Keywords: conduct disorder, prevention, community.

POSTER PRESENTATIONS

1. PROMOTION OF BETTER QUALITY OF LIVE OF ELDERLY PEOPLE

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Objective: To increase the involvement of the whole community for improvement of life and better health of elderly people. To improve standards and to usage of new achievements in science which have an impact in slowing down the process of early aging, functional disable or death, caused of bad diet, bad habbits and lifestyle of elderly people.
Methods of work: Promotion of social – medical model of approach, which will be a lead for achivment of dood health and balanced life of elderly people. Specialy is accented the role of every person and the community as a whole, in promoting of steps which should be made in every faze and area of the natural process of aging. That means changes in lifestyle, changes of way of living and better quality in aging.
Results: We take individual characteristics and experiences in lifestyle. 90 individual questionnarres are made. We made analisis. Fields of nessesary action are detterminated. They are grouped in several groups: Promotion of opportunities for decrease of the consequences of aging in outside appearance; Promoting of ways for improving of sensory capacity; Improvement of social place of elderly people and taking action of some specific disorders (fobbies, anxiety and stress).
Conclusion: In today's practice of elderly people we offer health care when they are sick and when promotion of health and healthy lifestyle don't have impact anymore. That is the reason why we should make follow up and to intensify promotion activities, like emphasing of damage of smoking, importance of physical activities or change in diet.

Key words:elderly people,lifestyle,promotion

2. HEALTH PROMOTION AMONG ROMA PEOPLE IN THE REPUBLIC OF MACEDONIA (RM)

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The aim of this paper is to present the activities that have been implemented for the purpose of promoting Roma health in RM until 2015.

Methods: Analytical and descriptive methods were used to provide an accurate image of the situation of the national policies and health status of Roma people.

Results: The Government of RM has anticipated specific activities and budget funds to promote Roma health as indicated in the National Action Plan under the Decade of Roma Inclusion (2005-2015), Programme for Mothers and Children, Systematic Check-Ups for Pupils and Students, Action plan for Safe Motherhood 2010-2015, Immunization Action Plan 2012-2015, etc. There is a challenge for the future because Roma people are still more affected by acute and chronic health problems (gastrointestinal and respiratory diseases, STD), underweight of Roma children, higher infant mortality, different forms of discrimination at health facilities, differences in terms of health protection of Roma women related to their health, reduced coverage by health insurance, etc. than other ethnical groups.

Conclusion: RM has made significant progress in standardizing legislation and implementing activities contained within the framework of the EU for promotion of Roma health status. Enhanced efforts are needed for further increasing awareness and health promotion among Roma people.

Keywords: Health promotion, Roma people, activities, health status, Republic of Macedonia

3. HEALTH LITERACY AND RISK TAKING BEHAVIORS AMONG USERS OF PRIMARY HEALTH SERVICES ON THE TERRITORY OF THE CITY OF BELGRADE

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BackgroundTheobjective of this study is to evaluate health literacy and its association with socio–demographic variables, self-perception of health, presence of chronic conditions and health risky behaviors of patients in primary health center in Belgrade.

MethodsThe research has beendone as a cross survey where a group of 36 patients from Primary Health Center Savski Venac (Belgrade) has been analysed. The instrument used was Stofhla questionnaire with questionnaire for gathering general information. The method of descriptive and inferential statistics had been used when processing the data.

ResultsAdequate level of health literacy has beenfound among 83,8% of the study group. Younger populations usually demonstrate higher rate of adequate health literacy (X^2=11,927, p=0,003) but it is associated also with employment status(X^2=4,690, p=0,030), better self-perception ofhealth (X^2=8,786, p=0,012) and presence of chronic conditions(X^2=11,765, p=0,003). Risky behavior, smoking, alcohol consumption and physical activity have had shown no significant impact on health literacy.

ConclusionThe correlations of the general health literacy with the social determinants as well as with the health related covariates indicatespecific vulnerable groups with theproportionally higher likelihood of limited health literacy in comparison to other groups.

Keywords: Health literacy, risky behaviors, primary health-care patients, Belgrade, STOFHLA

4. IDENTIFICATION OF POST STROKE PATIENTS WITH BAD QUALITY OF LIFE AND POSIBILITIE TO INCREASE QUALITY OF LIFE IN OUR HEALTH SYSTEM

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Stroke is the most frequent cause of disability in adult and it has been estimated that 30% of strokes leave residual disabilities, rising up to 50% in over the 75 years population. Tertiary prevention is only applicable to prescription medical devices subsidiary means for care. In difficult socio-economic conditions, these patients can be abused in several ways. The aim of our research was to assess the quality of life in post stroke patients, who are living with families in Bitola. Material and method: We have made one prospective study on 20 patients with age 65-80 years, and collecting data with questionnaire and SS-QOL scale. The questionnaire is consisting of personal data, age, sex, time after first attack, and use of orthoses and medical care sapless. Result: Our investigated patients have had middle quality of life, and with involve of tertian prevention it could be increase. Discussion: Some health interventions like home based rehabilitation and medical sapless put in exactly assess patient condition could be have positive impact on patient independent. Conclusion: Assessment of quality of life by patients with chronic disability must be the instrument in routine work for medical staff with aim to control condition of patient and the impact of socioeconomic factors on his life.

Kew word: chronic disability, tertian prevention, increase quality of life.

5. AGE CHARACTERISTICS IN MALE INFERTILITY AS A FACTOR FOR ASSISTED REPRODUCTION – DISCOVERIES AND LIMITATIONS

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Analyzing the issue of male infertility is connected to numerous unknown facts, starting from a definition (the official one in MKB-10 indicates the absence of conception after a year of unprotected sexual intercourse, although the practice mentions two years), different information sources for research based on different categories of examinees (the official statistics, the examination of infertile couples, donors, etc.) It is considered that in the overall registered infertility, the male share is 20=30%.While demographic data refer to mothers of born children; the data that refer to fathers are registered only in the countries with the longer practice of modern information technologies. Contemporary world researches emphasize the changes in achieving parenthood for both sexes, conditioned by the modern lifestyle, the need for a higher education level and abandoning the patriarchal family model. These kinds of factors lead to children being born by older parents, which is connected to numerous health risks for descendants. The contemporary approach in infertility treatment by assisted reproduction will enable the closer look to many unknown facts and dilemmas when it comes to male infertility. **The goal** of this paper is to get the insight into the types of male infertility in order to choose the most adequate treatment. **The methodology** is based on the analysis of men from the couples who have been treated from infertility at Gynecological- Obstetrics Clinic in Nis during the last year. 226 male partners were involved and they were classified into three age categories (up to 30 years, 31-40 and 41+), for whom the semen analysis was done and whose results were marked according to WHO criteria. **Results:** the age of examinees ranges from 30 to 65 years (the average is 36,9), in respect to sperm volume the significant difference was registered among the first and the other two groups(χ^2.....), the correlation between the abstinence period and the sperm volume shows the links of average strength in the 2nd age group; spermatozoid concentration shows the significant differences according to age (the biggest share in referential values is in the youngest: the result of ANOVA test for $p<0.01$ level; the percentage of alive spermatozoids according to the age groups was the biggest in the youngest group (88.7%), using ANOVA test we determined a statistically significant link on the level $p<01$ in all three age groups :$F(2, N=226)=6.46$, $p= 0.002$; the share of mobile spermatozoids in relation to the total number, according to WHO criteria (>50% mobile), measured by χ^2 test it shows the best result in the youngest group and statistically significant link among age groups χ^2 $(2, N=226)=24.5$, $p<0.001$. In the view of spermatozoids morphology, the normal spermatozoid representation of 15% and more is considered to be a positive result; the statistically significant link among age groups and normal shape is determined, measured by χ^2 test $X2(2, N=226)=19.38$, $p< 0.001$. In the oldest examinees category pathological forms were most present. Having in mind the analysis results, the most present were the examinees with normozoospermia(49.13%), where we can expect the success in fertilization depending on the fertile condition of the female partner. In the categories where oligozoospermiajom, asthenozoospermia, teratozoospermia, oligoasthenozoospermia, oligoteratozoospermiaand astenoteratozoospermia were diagnosed (31.42% of examinees), we can expect a lower success rate in fertilization, while the most unfavorable outcome is expected in men with diagnosed oligoastenoteratozoospermia (16.37%). In azoospermic males (3.1%), fertilization cannot be achieved due to the lack of spermatozoids. It can be **concluded** that the shown parameters, having in mind the WHO standards, represent the orientation for the application of the particular assisted reproduction methods. Besides them, based on the contemporary researches it is insisted on testing the integrity of spermatozoids DNAwhich demands additional adequate equipment of the institution for assisted reproduction. The authors advocate the adoption of directives in health institutions which will enable higher quality insight in vital and demographic indicators which will also allow the reproductive health to be perceived not only through female partners' parameters but through male's as well.

Key words:male infertility, spermiogram, assisted reproduction

6. THE ROLE OF HEALTH EDUCATION IN THE PREVENTION OF BREAST CANCER

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Breast cancer is characterized by high frequency and distribution, high share of morbidity and mortality, as well as limited opportunities for prevention.

The aim was to show trends in breast cancer incidence and mortality in Nišava district and the Republic of Serbia in relation to the same indicators in Europe and the world, and to emphasize the importance of health education work in the prevention of breast cancer.

Materials: Data were obtained from Institute for Public Health of Serbia and WHO. Crude incidence rates of breast cancer in the municipality of Aleksinac have been calculated per 100.000, based on the data of the Institute for Public Health of Niš and from the census 2002 and 2011. **Method:** Retrospective analysis of indicators of breast cancer.

Results for the period 2002-2012: In the municipality of Aleksinac crude breast-cancer incidence rate decreased sharply by 56% in 2003 (68.1/100,000) and than increased gradually up to 118.4/100,000 by the end of the period. The highest value was recorded in 2002: 153.3/100,000. Mortality data were not available. In Nišava district standardized incidence rates decreased from 75.2 to 66.4/100,000 (11.7%). The highest value was recorded in 2003: 75.3/100,000. Mortality increased from 17.1 to 24.2/100,000 (41.5%), and reached the peak in 2012. At the same time it was the highest mortality rate for the districts of Central Serbia. With the overall incidence of 69/100,000 Serbia is on the 19th place in Europe, ahead of all countries in Africa and Central America, and ahead of most countries in Asia and South America. With a mortality rate of 22/100,000 Serbia takes second place in Europe and 15th place in the world.

Breast cancer risk factors that can be modified are: alcohol, smoking, obesity, diet, lack of physical activity, reproductive factors, the use of exogenous hormones, night work and artificial light, chemicals in the environment.

Conclusion: The health education work aimed at preventable breast cancer risk factors throughout a woman's life, especially during childhood and adolescence, is necessary to reduce the adverse incidence rates.

7. FREQUENCY OF PAIN AND ITS IMPACT ON DAILY ACTIVITIES ADULT POPULATION OF NORTHERN KOSOVSKA MITROVICA

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Introduction: The existence of pain is a subjective feeling, which has a major impact on the health of each individual. One of the most commonly overlooked reason to doctor visits and represents a significant problem for the entire society.

Aim: The study is to show the incidence of pain and its impact on daily activities in relation to gender, age, education, economic status and physical activity of adult population of northern Kosovska Mitrovica.

Materials and Methods: The study included adult population of northern Kosovska Mitrovica. Information about pain, sociodemographic characteristics and physical activity were obtained with a questionnaire that was used to investigate the health of population in Serbia in 2013.

Results: The study included 86 men and 106 women. The total number of respondents who had a physical pain in four weeks that preceded the study is 87 (45.3%), statistically significantly more frequently among women ($p<0,001$) and older respondents ($p = 0.009$). The impact of pain on performing daily activities at home and abroad was statistically significantly more frequent in women ($p<0,001$), older respondents ($p = 0.005$), who are not employed ($p = 0.001$) and by the respondents who perform jobs that require heavy physical exertion ($p = 0.046$), while there was no statistically significant difference compared to the average salaries and education.

Conclusion: Women and older respondents often complained of physical pain for the duration of the test. Those with pain impact on perform daily activities belonged to the female gender, older population, people who are employed and those who perform heavy physical labor.

Keywords: pain, daily activities, adult population.

SESSION: CURRENT PARASITOSIS

INVITED LECTURES

1. THELAZIA CALLIPEDA: A "NEW PARASITE"

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Abstract

More detailed knowledge about the geographical distribution and prevalence of major health threatening, zoonotic pathogens can significantly contribute to the strategy of prevention and preclude the spread of vector-born zoonoses in Europe. Thelaziosis is fly-transmitted disease and climatic changes, economic problems, migration of people and animals, and changes in vector ecology influence increasing their prevalence in animals. This epizootiologic scenario can have an effect on humans who are natural host for *Thelazia* nematodes, too. This study reviews current data of human telaziosis.

Key words: *Thelazia spp*., prevalence, human thelaziosis, vector-born zoonosis

Introduction

Thelazia callipaeda (Spirurida, Thelaziidae) is a small nematode that infects the orbital cavities and surrounding tissues of domestic and wild carnivores, rabbits, birds and humans (1, 2). This arthropod-borne disease, also known as the “oriental eyeworm” due to dominant occurrence in the Far Eastern Countries (3), is transmitted by secretophagous flies of the genus *Phortica* (Diptera, Drosophilidae) (2) which is distributed throughout Europe (4). This vector releases infective third-stage larvae in the conjunctival sacs (5, 6) while feeding on ocular secretions of hosts (7). In affected hosts, *Thelazia* spp. causes ocular manifestations of different severity (8) such as conjunctivitis, epiphora, ocular discharge, keratitis and corneal ulcers (9).

Morphology

Thelazia eyeworms are creamy white, tread-like, parasites which lengths vary with species and sex. By using of morphometric analyses, it has been shown that female *T. callipaeda* adults are 12–18.5 mm in length and 370–510 µm in width (10, 11) while male adults of this species are shorter, from 7.7–12.8 mm in length and from 338–428 µm in width. In comparison with *T. callipaeda*, adult forms of *T. californiensis* are approximately 0.2-0.3 mm longer (12), the position of the vulva in the female and numbers of pre- and post-cloacal papillae in the male are different (*T. callipaeda* have 10 pre-cloacal and 5 post-cloacal papillae while *T. californiensis* have only 6-7 pairs of pre-cloacal papillae) (12, 13).

Light and scanning electron microscopic examinations have been used for morphological identification of *T. callipaeda* and *T. californiensis.* Differentiation of these two species by microscopic examination can be extremely difficult and requires high level of expert knowledge. *T. callipaeda* is characterized by ridged cuticle and non-segmented body with strong oral and anal part. Besides, the mouth opening has a hexagonal profile in both genders (14). In female adults, the vulva is located in the anterior region of the body with the esophagus. Anal opening is positioned 70–102 µm from the caudal end and two phasmids are presented on

the tip of the tail. As opposed to females, the caudal end of the male adults is ventrally curved with 15 pairs of papillae on the ventral surface (10 of which are pre-cloacal and 5 post-cloacal) (15).

Life cycle

T. callipaeda adult female nematodes release first stage larvae in the conjunctival sac of the final host. The first stage larvae are ingested by *P. variegata* when it feeds on lachrymal secretions of infected animal and/or human (16). After the ingestion, the first stage larvae penetrate the gut wall in a few hours and remain in the abdominal haemocoel for about 2 days. On the third day after infection, larvae invade the internal organs of vector (body fat in the females and the testes in the males) where become encapsulate and molt into the second (L2) and the third (L3) larval stage for about 14-21 days after infection (17). The third stage larvae migrate to the labella and may be transferred to the host while flies feed on the eyes surface (5). In the conjunctival sac, L3 can develop into the adult stage of parasite within approximately 35 days (14, 17). Without treatment, adult worms can persist up to one year behind the third eye lid (18).

Pathogenesis and clinical signs

Clinical manifestations of *T. callipaeda* infection occur as a result of mechanical damage of the conjuctival and corneal epithelium by the lateral serration of cuticle and depend on the number of nematodes present in the eye, their location, and the host response (15, 19). The most common symptoms observed in human infections include exudative conjunctivitis, follicular hypertrophy of the conjunctiva, excessive tearing, pain, irritation, ocular secretions, itchiness, congestion, swelling, hypersensitivity to light, and keratitis. (15, 19-22). However, in some patients may be developed severe ocular manifestations such as photopsia, decreased vision and ‘‘floaters’’ within the eye chamber, a partially blocked field of vision, or even blindness. Besides, some studies have reported the presence of follicles, ulcers, nubecula, swelling, paralysis of the eye muscles, ectropion, and papilloma in infected humans (15). Secondary infection with bacteria may result in progression of ocular lesions (19).

Treatment

Treatment includes removal of the worms that immediately solves symptoms and signs of infections. In some cases, irrigation with lugol iodine or boric acid can be used to remove worms from lacrimal duct (23). The best choice is prevention of infection with strategies for better monitoring of the disease, establishing the link between medical doctors and veterinaries following by constant education.

Epidemiology

From the epidemiological point of view, *Thelazia callipaeda* (*T. callipaeda)* is more prevalent in dogs, cats, and humans on the territory of former Soviet Union and the countries of the Far East, East and Southeast Asia while another species, *T. californiensis*, is responsible for infections in cats, foxes, coyotes, sheep, deer, horses, rabbits, black bears and rarely humans in the United States. (15, 24-27). By sequencing of partial cytochrome c oxidase subunit 1 (cox1), it has been shown that all *T. callipaeda* isolates in Europe, irrespective of country of origin and hosts, belong to the haplotype 1 (h1) (2, 5). On the contrary, the presence of seven different haplotypes has been determined in Asia (2).

The first cases of canine thelaziosis described in Europe were in northern Italy (7). In recent years, sporadically infections with *T. callipaeda* have been registered in dogs from France and Germany which had spent some time in northern Italy (28). Also, some studies have reported the occurrence of thelaziosis in dogs and cats from Spain, Switzerland and Portugal (29).

Due to increased activity of vector during the spring and summer, higher rates of infection have been reported in this period. Additionally, studies have recorded two peaks of infection, in the early summer and in late summer, which is understandable considering the fact that adult worms can persist more than one year in the eye of host (29).

Human infections can be caused by *Thelazia callipaeda* and *Thelazia californiensis*. Until today, more than 250 cases of human thelaziasis have been reported in different studies from China, Japan, Korea, Thailand, Indonesia, India, Italy, and France (30). Generally, the prevalence of human thelaziosis correlates with prevalence in animals and it is also more common in children and elderly. In some European countries, despite the increasing of animal thelaziosis, no human cases have been described (8).
Recently, in our country there were reports of this parasitosis (parasitological and molecular confirmed) in pets from different areas in Serbia, mostly central part, west part and two cases from South-eastern Serbia (14, 31). The most interesting finding was the first autochthones human case in Southeasten Serbia which was identified by molecular analysis. Diagnosed thelaziosis in dog-pets guarded in controlled conditions of life in the urban/rural areas of Serbia and established the spread of zoonotic *Thelazia callipeda* in the Balkan area and our environment conditioned that we can expect more human cases of thelaziosis and more attention to this parasitic infection has to be paid not only from veterinary practitioners but also from physicians (32-34).

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2. WHAT GETS IN YOUR EYE? SMOKE. AND PROTOZOA

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Protozoan parasites affecting human eyes are highly diverse. Transmitted to humans directly, from the environment, water or food, or via a vector, protozoa cause a variety of symptoms, which depend on the route of entry into the eye, agent characteristics and pathogenetic mechanism involved. Protozoa enter the eye exogenously, usually after trauma (bite) or surgery, and endogenously, from adjacent tissues or by hematogenous dissemination into the eye (many are opportunistic). The epidemiology of ocular protozoan infections is complex and depends on the agent, reflecting its habitat (geographic location, presence of vector), on the host, reflecting the patient habits and health, as well as the (immuno)pathogenetic mechanism involved (immune defense vs. immunopathology), and on societal factors, including socio-economic and general hygiene levels.

Although geography is a major variable determining the risk of a particular protozoan infection, the increasing volume of international travel and migrations to and fro across the globe tend to blur the once clear-cut borders and it is thus important to remind of the major protozoan risks.

Chagas' disease. Caused by *Trypanosoma cruzi*, it is endemic in Central and South America, the natural habitat of its *v*ector, the reduvid (kissing) bug. *T. cruzi* causes a nodular inflammatory response (chagoma). If the bite is near the orbit, palpebral and periorbital edema may occur; this chagoma is called Romana's sign, the hallmark of Chagas' disease [1]. However, ocular involvement in Chagas' is rather innocuous, it is a serious disease due to systemic complications, including cardiomyopathy and intestinal elongation. Diagnosis is easy in the acute stage by direct observation of trypomastigotes in the blood. Serology is of little value, but PCR has proved valuable [2]. Treatment is long-term, often unsuccessful in terms of parasitological cure, and the usual drugs (nifurtimox and benznidazole) are burdened with side effects.

Malaria. By far the most important parasitic infection, malaria affects millions worldwide with up to a million deaths per year, while putting half of the world population at risk (Sub-Saharan Africa, Central and South America, Oceania, Asia). Transmitted to humans via the *Anopheles* mosquito, it is caused by 5 *Plasmodium* species, including *P. falciparum*, *P. vivax*, *P. ovale* and *P. malariae*, and of late, *P. knowlesi* [3]. Although autochtonous malaria is considered to be eradicated from most of Europe and the US, imported cases are increasing due to travel and immigration. Moreover, it is conceivable that the current global climate changes may create an appropriate environment for novel niches of *Anopheles* and therefore for malaria. Ocular disease may occur during cerebral malaria. The most common ocular manifestation is haemorrhage, associated with poor prognosis. Whereas malaria requires prompt and energetic treatment, notably chloroquine and its derivatives themselves may be the cause of ocular disorders occurring at the time of treatment or later.

Leishmaniasis. Caused by *Leishmania spp.* and transmitted to man by the *Phlebotomus* sandfly, its main areas are Asia, Middle East, Africa and the Meditteranean. Disease occurs as visceral (kala azar) and cutaneous leishmaniasis (VL and CL respectively). CL is more frequent and consists of local infection at the bite site; if bite is near the eye, signs include ptosis, periorbital inflammation and necrosis whereas if it is on the conjunctiva, the disease is muco-CL which may cause severe ulceration and result in eye loss. In VL, ocular disorders are fairly uncommon, but include chorioretinitis, retinal vein thrombosis, iritis, papillitis and keratitis. Diagnosis of CL is direct, as amastigotes are easily demonstrated, while diagnosing VL is challenging as it is a consequence of immunopathology. Treatment includes amphotericin B and

pentamidine, and of late, miltefosine, the first extremely effective oral agent for VL [4]. Notably, post-treatment glaucoma has been described [1].

Acanthamoeba keratitis. Caused by *Acanthamoeba spp,*. keratitis was recognized as a new entity in the 80s' and thereafter described mainly in the US [5]. It is associated with the use of contact lenses, as corneal injury is a predisposing factor. Keratitis presents with severe pain, conjunctival edema and loss of vision. Treatment is difficult; drug therapy often fails, so that keratoplasty is left as the only alternative. Prevention measures include banning tap water from lense solutions, and advising against those home-made.

Toxoplasmosis. *Toxoplasma gondii* is a cosmopolitan protozoan which infects one third of the global population. Generally mild and self-limiting in immunocompetent individuals, *Toxoplasma* may cause life-threatening disease in the fetus and in the immuno-suppressed host. Historically, ocular disease was the first clinical entity to be associated with toxoplasmosis. Ocular toxoplasmosis (OT) is most often presented as focal retinochoroiditis, triggered by the reactivation of dormant parasites in the retina. OT is the most common cause of infectious posterior uveitis worldwide, developing equally after acquired and congenital infection [6,7]. OT occurs in clinically more severity forms in South America, which has been associated with the atypical parasite genotypes prevalent in that region [8]. As fetal infection may only develop following maternal primary infection in pregnancy, congenital toxoplasmosis with its ocular complications is preventable. On the other hand, acquired infection, often inapparent and therefore clinically unrecognized, is the current diagnostic and therapeutic challenge. In contrast to other *Toxoplasma*-induced entities, diagnosis of OT is often clinical and treatment given *ex juvantibus.* Serology is only confirmatory since OT may be accompanied by any IgG finding. The current method of choice is detection of Tg DNA (PCR) in aqueous humor.

Microsporidiosis. Caused by *Encephalitozoon*, *Nosema* and *Septata*, microsporidiosis occurs throughout the world as an opportunistic infection, both directly and by systemic dissemination [9]. Ocular affection involves conjunctiva and cornea (hyperemia, keratitis, corneal ulcer), while severe infection may result in blindness. Demonstration of spores in corneal scrapings is diagnostic, but as they are rather small, electronic microscopy may be needed. Treatment may be even more challenging, but albendazole has shown effect [1]. Still, the real treatment is prevention.

To conclude, ocular protozoan infections, while often neglected, may cause significant sight impairment or blindness; this significant public health risk obviously requires control in both the developed and developing world. Whereas recent advances in our insight into the molecular biology of the various agents and in the immunology of infections as well as in the understanding of the host-parasite relationship may translate into advancement in the field of diagnosis, the poor accessibility to sophisticated diagnostic tools where they are needed, coupled with a lack of interest of the pharmaceutical industry for the development of drugs for diseases conceived as diseases of the poor, do not provide grounds for optimism in terms of expectations for the near future. However, health education campaigns to increase public awareness and working with stakeholders including policy makers to lower environmental and animal reservoirs of infection is feasible and should be continuous.

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3. HUMAN OCULAR HELMINTHOSIS

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In many parts of the world parasitic infections of the eye cause serious ocular diseases (Acanthamoeba keratitis, ocular toxoplasmosis, and ocular toxocariasis) and blindness. Human ocular helminthosis are more prevalent in the tropic areas with poor sanitation, but parasitic infections of the eye have occurred more frequently in recent years due to the increased number of immunocompromised people, population aging, its migration, as well as vectors migration, and global warming (1). Some parasitoses, ie. helminthosis, show facilitated spreading from the endemic areas to nonendemic and these zoonotic diseases can be caused by nematodes, cestodes and trematodes (2). The most prevalent are: *Toxocara canis*, *Onchocerca volvulus*, *Taenia solium*, and *Ancylostoma caninum* (2, 3). Helminthic eye infections include those transferred by vectors (dirofilariosis, onchocerciosis, thelaziosis), foodborne (sparganosis, trichinellosis) and those that are transferred directly from the environment (ascariosis, echinococcosis, fasciolosis) (4).

Adult forms of helminths or their larvae can infect eye adnexa and surrounding tissues (eyelids, conjunctiva, lacrimal gland) or the eyeball (anterior and posterior chamber, vitreous body, retina or optic nerve). The eye lesions may occur due to the direct damage caused by infectious pathogens, indirectly caused by toxins, or the immune response stimulated by infection or parasites transition from immature to adult form (1). Ophthalmic examination can provide evidence of the underlying causes of a disease whereas a history of travel or residence in endemic areas can solve ocular presentation. However, it is not so simple in the case of helminthosis that are not characteristic for our area (5-7).

Helminthic eye infection can be caused by Cestodes (*Taenia crassiceps, T. saginata, T.solium, Coenurus cerebralis, Spirometra spp., Echinococcus granulosus, E. multilocularis, E. oligarthrus*), Trematodes (*Fasciola hepatica, F. gigantica, Alaria mesocercaria, A. americana, Philophthalmus lacrimosus*) and Nematodes (*Trichinella spiralis, T. zimbabwensis, Toxocara canis, T. cati, Baylisascaris procyonis, Gnathostoma spp., Dirofilaria repens, D. immitis, D. roemeri, D. tennis, Thelazia callipaeda, T. californiensis*). Studies have reported variety of filariae which cause infections of the eye or the conjunctiva. Some of these reports appeared even a few hundred years ago. Besides the already well-known *Wuchereria bancrofti, Bruges malaii* and *Loa Loa*, some types of filariae, which primarily infect domestic and wild mammals, can also cause infections in humans (eg. *Dirofilaria spp., Onchocerca spp., Acanthocheilonema (Dipetalonema) spp., Brugia spp.*, and *Loaina spp.*) (8).

Human ocular infections caused by *Taenia crassiceps* may occur accidentally by drinking contaminated water or eating uncooked food infested with eggs of the worm. *T. crassiceps* is the tapeworm in close connection with *Taenia saginata* and *Taenia solium* which an adult form parasitizes in the intestines of carnivores. The presence of larvae *T. crassiceps* in the anterior chamber or subretinal tissue in immunocompromised individuals has been reported both in the US and in Europe. This infection may be followed by iridocyclitis, and/or retinitis or asymptomatic. A successful treatment is achieved by surgical intervention (4).

Human cysticercosis is an infection by the larval stage of the tapeworm *Taenia solium*. The infection is most often localized in CNS, eyes and subcutaneous tissue. In ocular manifestation of the disease, the most common localization of the cysticerci (*Cysticercus cellulosae*) is subretinal space, and macula, where larvae get through short ciliary arteries. Furthermore, the larvae can penetrate to the anterior segment of the eye: ciliary body, iris and anterior chamber. The presence of helminths is usually accompanied by a severe intraocular inflammation, thick blur in the vitreous body and decrease in visual acuity. In order to establish a

diagnosis, the examination of aqueous humor, ELISA test for specific antibodies to *Cysticerci* antigens and cytology of aqueous humor which shows a pronounced eosinophilia, can be performed (9).

Coenurus cerebralis is a larva of *T. multiceps* (*syn. Multiceps multiceps*), developing in the small intestine of dogs, foxes, and other canidae. Coenurosis rarely occurs in humans, usually causing brain lesions. However, it can cause severe anterior uveitis, retrolental or orbital cystic tumor, and subretinal lesions. Subconjunctival localization may be due to direct infestation of infected eggs. An inflammatory response results in redness and pain, glaucoma, retinal fibrosis, and eventually blindness. Surgical removal of cysts is the only available choice of treatment (4).

Spirometra spp. is a tapeworm of domestic animals and humans. People are dead-end hosts, infected mainly by drinking contaminated water or eating the intermediate host (eg, frogs, birds, snakes). It occurs in the US, Central Europe and Asia. Spargana usually infects conjunctival and subconjunctival tissue, causing itching due to local granuloma, irritation with a foreign body sensation in the eye, redness, pain, epiphora, chemosis, ptosis and even orbital cellulitis, exophthalmos, anterior uveitis. Unfortunately, surgery is the only effective treatment (4).

Echinococcus granulosus, Echinococcus multilocularis and *Echinococcus oligarthrus* are tapeworms spread around the world. Although not very common, eye infections with larvae of *Echinococcus spp*. can occur due to bloodstream expansion of oncosphera. *Echinococcus cyst* is the most common in orbit, leading to progressive exophthalmos with strong pain. There can be a decrease in vision, limited mobility of the eyeball, chemosis or secondary infections. Intra-orbital hydatid cysts can cause even blindness because the cyst has the ability to fulfill vitreous cavity. Severe inflammation and acute vision loss result from rupture of intraocular cysts (4).

Fascioliasis is caused by *Fasciola hepatica* and *Fasciola gigantica*, trematodes of the biliary ducts of domestic and wild ruminants (eg, cattle, sheep, goats, buffaloes), but also horses and rabbits. Immature forms of *F. hepatica* mainly migrate through the bloodstream in humans and reach the lungs, subcutaneous tissue, and brain. However, the appearance of parasites in the anterior eye chamber of the patients has been reported in Iran (4).

Alaria americana (*syn. canis*) is a three-host trematoda, that lives as an adult in the intestines of dogs as a definitive host. Snails, frogs, and snakes are intermediate hosts. Cases of human ocular infections with mesocercariae *of A. americana* and other *Alaria mesocercariae* occured in patients who have eaten improperly cooked contaminated frogs' legs. In these patients, pigmentary plaques in the retina activated retinitis and signs of diffuse unilateral neuroretinitis have reported (4).

Schistosomiosis represents the disease caused by trematode flukes of the genus *Schistosoma* that occurs in Africa and the Middle East. Ocular schistosomiasis occurs via hematogenous dissemination of *Schistosoma haematobium*, and is accompanied by swelling of the eyelids, acute dacryoadenitis, conjunctivitis, granulomatous anterior uveitis, orbital pseudotumor or retinal vasculitis (9).

Philophthalmus lacrimosus (*Philophthalmidae*), as an adult form is a parasite of bird’s eyes (definitive host). Snails are intermediate hosts. Philophthalmosis human cases have been reported in Europe (Yugoslavia), Israel, Asia (Thailand, Sri Lanka, Japan) and America (eg, Mexico and the United States) (4).

Trichinosis is caused by cylindrical worm *Trichinella spiralis* that can be found in the extra ocular muscles and eyelids muscles. Ocular form of the infection is followed by eyelids swelling, double vision, ocular misalignment dysfunction, conjunctival swelling, subconjuncitival haemorrhages or pain during the eyeballs movements (9).Toxocariasis is caused by *Toxocara canis* and *Toxocara cati*. *T. canis* is the most common cause of unilateral uveitis in children younger than 7 years. This is the worldwide disease and can occur in four forms: localized posterior granuloma, peripheral granuloma, chronic endophthalmitis, visceral or subretinal abscess (9).Gnathostomosis is a zoonotic disease caused by several species of the nematode genus *Gnathostoma*. The definitive hosts of *Gnathostoma spp.* are dogs, cats, pigs, wild animals, raccoons, and

opossums. Due to the large number of transient (eg, fish, frogs, chickens, birds, snakes, lizards, pigs, crabs, monkeys, hamsters, rats, squirrels and guinea pigs) and paratenic hosts (birds, snakes, frogs), the control of these parasitic infections is particularly difficult. Prevention is achieved by avoiding the consumption of poorly cooked food or the use of raw meat. Ocular infections are less common than cutaneous larva migrans or visceral. This larva can invade the surrounding ocular tissue as well as the eyeball itself. Clinical signs are swelling, hemorrhage, inflammation in orbit, corneal ulcer, uveitis, vitritis, secondary glaucoma, and arterial occlusion in the retina (4).

Dirofilariosis is caused by *Dirofilaria spp.*, parasitic nematodes of domestic and wild animals. Ocular dirofilariosis is mostly caused by species *D. repens* which is present in Old World (occurs in Europe, Asia and Africa). Infections are vector-born by mosquitoes; they carry the parasite from their animal host to people. The main clinical signs and symptoms include: pain, swelling, inflammation, conjunctival hyperemia, foreign body sensation in the eye. The worm is usually localized subconjunctivaly, encapsulated, or in the subcutaneous tissue of the eyelids, and can be removed by excision. After the diagnosis, the recommended treatment is a surgical removal which achieves the complete cure, with no sequelae, and preserves a visual function. Dirofilariae can also be found in the anterior chamber or vitreous body. Only a few of them have been successfully removed in its entirety, and identification was performed mainly on the basis of morphology, very rarely based on the PCRs (7). An intravitreal dirofilariasis case has been recently reported in Turkey (10). Hundreds of ocular dirofilariosis have been reported and there are new cases from various geographic regions, including areas where they have not been previously registered. Undoubtedly, there are many more cases that occur but are not recognized or reported. The incidence is increasing and human dirofilariasis is considered as "emergency zoonoses" (5-7, 10-20).

Thelaziosis a good example of human helminthic eye infection is something new for the most doctors. *Thelazia callipeda* occurs in Old World and *Thelazia californiensis* is responsible for human infections occurring periodically in the United States. This nematode primarily affects the eyes of domestic dogs and cats and wild carnivores (eg., foxes, wolves, and wild cat) (24-26). The transfer of the eye worm takes place via nonbiting Diptera, feeding on the tears and ocular secretion of the animals conjunctiva. It is characteristic for the Asia Pacific region. The disease is characterized by a broad spectrum of subclinical and clinical signs: epiphora, conjunctivitis, keratitis, reducing corneal transparency, and ulcers (5,6, 26,27). Healing in humans is reached by the removal of the parasites.

Onchocerciosis (River Blindness) is endemic filariosis caused by *Onchocerca volvulus* microfilariae. The disease is confined to the areas around the major river systems. This is the main cause of blindness in endemic areas of equatorial Africa and Central America. It is estimated that 37 million people in 34 countries in sub-Sahara Africa and South America are infected (1). These microfilariae release adult, female worms, which migrate from the subcutaneous tissues to the eye and may be present in the aqueous humor, and they accumulate at the bottom of the anterior chamber resembling to hypopyon. They can cause keratitis, iritis or iridocyclitis. They also cause diseases of the posterior segment of the eye: chorioretinitis, retinal vasculitis, and optic nerve atrophy (4). There is a growing number of reports of zoonotic infections by *Onchocerca*, and several of them have been associated with conjunctival infection, orbit connective tissue, even anterior eye chamber. These reports are from the Crimea, USA, Albania, Hungary and Turkey (21-23).

Loiasis is a neglected tropical disease caused by filarial parasite ***Loa loa.*** This vector-borne disease, popularly known as "African eye worm", is presented in areas in and around the rainforests and swamps of Western and Central Africa (28). The disease is transmitted to humans by the bite of a Deer fly or Mango fly (*Chrysops spp.*) (29). Nematode can cause ocular infection that includes conjunctivitis, uveitis, and retinopathy (9). Furthermore, recently studies have recorded occurrence of ocular pain, pruritus, tearing and foreign body sensation in some infected patients (30). Unfortunately, data on helminthic eye infections are scarce and reduced to case reports from different countries and regions. Ophthalmologists are often faced with difficulty to get adequate diagnosis, current information about the disease cause and therapeutic

possibilities. Mostly, the detection and identification of causative agents is only possible after surgery and extraction of worms or a tissue that contains the worm, and often requires the parasitological analyses in order to identify helminthes based on morphological and morphometric characteristics. In some cases, the identification is possible by observing the worms under the conjunctiva, in the anterior chamber or by measuring larvae on the retina. In those cases, where the parasite is located in the vitreous body or retina, we perform photocoagulation, laser or vitreoretinal surgery without the possibility to identify the cause. Nevertheless, surgery remains the only option for the complete recovery of helminthic eye infections.

However, many cases of these zoonoses can be prevented by relatively simple measures to improve health and general sanitary conditions, as well as by increasing the awareness of the doctors, veterinarians and the people themselves.

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POSTER PRESENTATIONS

1. SCABIES IN THE POPULATION OF BELGRADE IN THE PERIOD 2005-2014. YEARS

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Aim: The paper describes the epidemiological characteristics of scabies infestations in the Belgrade in the period 2005-2014. years.

Method: The study was performed descriptive epidemiological study. In analyzing the data, the crude an age-specific and standardized incidence rates were used. The standardization is carried out by the direct method, using the world population as a standard.

Result: According to the annual report regarding the work in the prevention, combating and elimination of infectious diseases, in the past decade a total 9,368 persons have been affected by scabies. The highest average age-specific incidence rates for scabies were registered in the age group 5-9 years and amounted to 159.7 per 100,000 inhabitants. The average standardized incidence rate for scabies was 80.7 per 100,000 inhabitants. Peak occurrence of scabies was from October to November (25.8%). The average incidence rate for scabies for urban municipalities amounted to 56.8 per 100,000 population, and for rural municipalities 57.9 per 100,000 population. In the period 2005-2014. in Belgrade registered 14 outbreaks of scabies in which infested 195 persons, and most outbreaks have been registered in unhygienic Gypsy settlements (28.6%).

Conclusion: The observed trend of increasing infestation of scabies points to the necessity of active search for unreported or unrecognized infected person in a family or as a collective and timely prophylactic treatment of contacts.

Keywords: scabies, incidence, infestation, Belgrade

EPIDEMIOLOGY SESSION

Topic: THEORETICAL AND PRACTICAL PROBLEMS OF COMMUNICABLE DISEASE EPIDEMIOLOGY

INVITED LECTURES

1. LOCAL AND GLOBAL EPIDEMIOLOGY: OVERCOMING THE GAP

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Over many decades, epidemiology in Serbia and Yugoslavia, as well as in all East European countries, was heavily influenced by the Soviet School of Epidemiology. This doctrine had some achievements between the two World Wars, e.g., the search for natural foci of infection (Pavlovskii), the concept of epidemic process, at least as initially developed (Gromashevskii), etc. Later, however, it got petrified and therefore doomed to fail.

Soviet epidemiologists were not medically trained, but educated at the Sanitary and Hygiene Faculties. Their practice was strictly restricted to infectious diseases and heavily burdened by ideology, little attention was paid to gradient of infection, the emphasis was on isolation and disinfection, and epidemiological methods were unknown.

A few international epidemiological studies involved Russian clinicians (Y. Chazov, N.N. Blokhin), but had no impact whatsoever on the local theory and practice of epidemiology. Some Western textbooks (IEA's Dictionary of Epidemiology, WHO's Basic Epidemiology) were translated into Russian but to no avail. As the first Russian modern epidemiologist, V. Vlassov put it in 2000: „Epidemiology in Russia remains in an archaic state of science of the spread of infectious diseases and it is detrimental to methodology of medical research in Russia." (1) Even nowadays, Vlassov does not enjoy much support at home.

Why then to bother with a backward science far away from us? The point is that a tedious fall of love with the Soviet School of Epidemiology in this part of the world is a process that is still going on. Relatively recent "arguments" against modern epidemiology were as follows: "Why changing the approach that has been proved in practice? We should respect our own experience! Our teachers hopefully knew what to teach us about!" By the same token, the world would still stick to the Socrates' philosophy.

Modern epidemiology was born in 1949 (Framingham study) and 1950 (Doll & Hill' case-control study on smoking and lung cancer). Some basic textbooks have been translated into Serbian (2, 3, 4), but without a major effect. At the First (and the only) Congress of Yugoslav Epidemiology in 1986 there were only five papers on analytical epidemiology, two cohort and three case-control studies (all from the Institute of Epidemiology in Belgrade).

Almost three decades later, the teaching of and research in epidemiology progressed in most Serbian Schools of Medicine, but the practice did not experience major changes. The stagnancy has been recognized in an official report on Serbia prepared for the European Commission (5). Two statements reflect the point: the first, that „Analytical epidemiology is mainly descriptive" (awkwardly phrased, but basically true), and the second, that „(There is) No process for formulating analytical study design to identify risk factors or other determinants of disease in the field".

To put this criticism in a broader perspective, Serbia has had more advanced epidemiological research and teaching than other Yugoslav republics, leave along neighbouring countries (with a possible exception of Greece).

In 2000, a Task Group on Competence Criteria of the European Epidemiological Association summarized the position of epidemiology in the Balkans as "No recognition of the discipline epidemiology yet"(6). (As a matter of fact, Professor G. Zielhuis, as Chairman, apologized on behalf of the Task Group and included data on Serbia in the final report.) Historical importance of the conclusion reached by this group and broadly accepted has been to advocate only academic track (MSc, PhD) for studying epidemiology in Europe. Infectious disease epidemiology has been left to infection control staff, including graduate nurses, who would not have a position equal to Board certified specialists. As for the other aspects of operational epidemiology, it has been left to public health people, with the assumption that epidemiology, as the basic science of public health, would have a major role in their education.

More recently, EU declared its initiative for Mediterranean Programme for Intervention Epidemiology Training (MediPIET). The declared objective is „to meet challenges of communicable diseases", and competences include "field epidemiology and public health microbiology". The disturbing facts are duration of the training (only 24 months) and its supposed „target" **(**Middle East, North Africa, South East Europe, etc.). It appears that the basic idea has been to guard Europe from pestilences, keeping them at a bay by semi-qualified local people.

An improvement was the proposal launched in 2014 to extend duration of the MediPIET to 48 months and to broaden its context ("to enhance global health security with respect to biological - but also chemical, radiological and nuclear – threats"). This way, such training would be, at least formally, equal to other specializations. However, the programme extension is still a matter of future.

It is imperative for epidemiologists in the region to be proactive and vigorously analyze, consider, and evaluate changes that are ahead in teaching, research and practice of their specialty.

One may conclude:

1. Over many decades teaching and practice of epidemiology in the former Yugoslavia (and even much more in the Eastern Europe) were heavily influenced by the Soviet School of Epidemiology.
2. Remnants of the past are still present to a different degree.
3. In spite to the obstacles, modern epidemiology put its foot on the local soil and the process is perpetuating.
4. It is inevitable to adopt EU educational standards in epidemiology, i.e., to acknowledge and expand the already existing academic tracks (MSc, PhD).
5. One should make all the efforts to keep field/operational/interventional epidemiology as a Board certified specialty.
6. Though strange to many colleagues, there will be hard to resist the idea to have non-physicians as epidemiologists.

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2. PUBLIC HEALTH, COMMUNICATIONS AND CURRENT ISSUES IN IMMUNIZATION

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3. EPIDEMIOLOGICAL CHARACTERISTICS OF VACCINE-PREVENTABLE DISEASES

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Abstract: Vaccination is regarded as the most important health advance in the twentieth century and is expected to continue this role in the twenty first century. Despite this success, more than 3 million people die from vaccine-preventable diseases each year. Approximately 1,5 million of these deaths are in children less than 5 years old.
The aim of the paper was to describe and to collate information on vaccination coverage assessment for different vaccines. To compare morbidity and mortality before and after widespread implementation of national vaccine recommendations for 7 vaccine-preventable diseases for the period 1953 - 2013 in the Nishava, Toplica and Pirot District.
Material and method: Data about vaccine coverage rates against diphtheria, pertussis, tetanus, poliomyelitis, morbilli, parotitis, rubeolla were retrospectively analyzed. Vaccination coverage assessment was done annually. Morbidity and mortality were calculated per 100 000 inhabitans.
Results: Vaccination against diphtheria, tetanus and pertussis (DTP) had the highest vaccine coverage rates ranged 92,2 to 99,7%; Vaccine coverage rates for the oral polio vaccine (OVP) ranged 87,1 to 99,3% and for measles, mumps and rubella (MMR) vaccine rates ranged 77,1 to 99,3%. The latest cases of diphtheria was registered in 1970. Diphteria is almost eliminated disease due to vaccine. It is undoubtedly that pertussis became a milder disease in our territory country over the course of the first half of the twentieth century. Before the introducing the vaccine against measles in Serbia in the period 1958-71 the highest number of registered cases were young children 0-4 godine 62,53% and in the age group older than 20 years 0,47%. In the period 2000-2013 the cases in adults increased to 32,88%. The introduction of measles vaccination throughout the region led to longer interepidemic periods and a shift in the age distribution of remaining cases toward older children and adults.
Conclusion: Vaccine-preventable diseases still exist. In the territory of former Region of Niš a greater number of cases was registered before the period of the introducing vaccination against vaccine-preventable diseases.
Key words: immunization, vaccine-preventable diseases

One of the most effective measures for the prevention of infectious diseases is immunization. Numerous examples and lessons learned have shown that the proper and systematic vaccination can be performed with succesfully work on reducing the morbidity and mortality of many infectious diseases, and often at the elimination and even eradication of some of them. Application of immunization fight against infectious diseases has received a very powerful weapon.

Despite the efforts, vaccine preventable diseases take to three million lives per year which accounts for about 5 % of all deaths globally. An average of 1.5 million children under five die every year from vaccine-preventable diseases, with a share of 17 % in the total number children in this age.

Efficiency rates of vaccination depends on many factors, in particular: preparation of the immunogenicity of the (vaccine), the immune response of the organism to the input of the vaccine properties of pathogens, in particular an antigen stability and the nature of the process and epidemic disease. However, its ultimate success depends of how the tactics of the vaccine made (when vaccinated and when), and whether it will be fully implemented.

The main goal of immunization is to reach and maintain 95 % more coverage of compulsory immunization program at the level of the entire population of children that the calendar should be vaccinated (all kids, all vaccines without demographic, territorial and social differences).

Over the years the vaccination have acquired a rich tradition, as fewer people becoming ill from a disease against which the conduct of vaccination (ie. Vaccinable disease), elimination and eradication and some serious infections (such as smallpox and polio) vaccine is achieved by applying. They created an outstanding reputation in the nation. In our country implements the compulsory systematic immunization against certain infectious diseases on the basis of the Law on Protection of Population from Infectious Diseases (Sl. No.125 / 04), the Ordinance on immunization and the way how to protect drugs (Fig. Gazette RS No.11 / 06; 25/13; and 63/13), and since 1977 is being implemented and a special programming work on prevention, control, removal and eradication of certain infectious diseases (primarily in the area of the central part of Serbia), and since 1994 in the whole Rapublic of Serbia (program of protection from infectious diseases - Sl. No. 5/94), to the implementation of this program continue in the coming period by 2010 (Fig. Gazette no. 29/02).

The **main goal of this** work was to make the impact of immunization on the disease burden of the individual vaccinable diseases, as well as monitoring changes in some epidemiological characteristics of the disease in the period after the introduction of mandatory immunization.

In preparation of this work were used applications of infectious diseases to the Centers for Disease Control and Prevention, the annual report on infectious diseases of the Public Health Instutute in Nis and the Institute of Public Health in Pirot, as well as reports on completed immunization health centers in the tested area.

The descriptive and analytic method of work have been used in this study.

The rates of incidence were calculated per 100 000 population censuses of 1961, 1971, 1981, 1991, 2002 and 2012.

At the area once called the Nis region and Nisava, Toplica and Pirot, vaccinations have a long tradition and are carried out with very good results, when results are achieved coverage of taxpayers 95-100% (Chart 1). But in the last two years of the observed period (2012 and 2013), this percentage is well below the required minimum (for DPT 92.3% and 93.5%, 87.1% OPV, while the coverage for MMR in years is below 95%. Only in 1996, 1997, 1998, 2002, 2010 and 2011. In achieving the desired percentage. This is the result of irregular supply to foreign and domestic vaccines, more-present demands of parents to refuse vaccinations for their children, as well as increasingly more present operation antivakcinalista. Of course even the experts are not unanimous in their opinions about the use of certain types of vaccine, and ultimately, it contributes to the outdated calendar vaccination. Because of this it is the case that the epidemiological situation of some

diseases against which implements compulsory systematic immunization as unsafe, but under the control of the health service.

Following the movement of vaccinable infectious diseases in the analyzed area for more than 60 years (1953-2013) initially can be seen that the greatest successes have been achieved with diphtheria and polio. These diseases have been eliminated or eradicated (polio) and only and only thanks to the successful immunization. However, more than forty years ago in this area there is no diphtheria, polio is not. The last indigenous case of diphtheria was recorded here in 1967. However in 1970 were registered 2 cases of disease. In one family who moved here there have been affected the two children, who were not vaccinated. And here, to this day, diphtheria us more in this area. A similar situation exists with poliomyelitis. In the past few decades have been reported only 3 cases of diseases (1976-2 and 1979-1) among unvaccinated children. It is known that in 2002 the World Health Organization declared the disease eradicated in the countries of the European region, and we are now in the maintenance phase status of the country polio free. However, supervision of the acute flaccid paralysis is done very badly. Things get even more complicated due to the increased influx of immigrants from countries where it does not implement a successful immunization and epidemiological situation of vaccine-preventable diseases is unknown and the risk of importing these diseases in our country.

Tetanus is a disease in which the number of patients has never been big in this area, but the problem of tetanus and is not in a high morbidity rate, already at a high fatality rate, which is without the use of treatment close to 100%, and in addition to all contemporary and timely applied medical measures remains around 25 -30 % in most developed countries.
Navigating the incidence of tetanus in the analyzed area for the period 1953-2013. has been shown in Figure 2. Due to the length of the period under review we found it more practical consideration of the five-year period (Figure 3). Note the continuous decline in the number of patients. It can be seen that most of the reported cases were recorded in the years when it has not implemented mandatory sistemetska vaccination and for some time while vaccination coverage was not satisfactory. The widespread use of vaccines against tetanus begins only after the Second World War, when some countries create programs for immunization of certain groups of the population. In Yugoslavia, as required by this vaccine is introduced as early as 1946, but only since 1961 begins compulsory systematic vaccination. With the introduction of the program of work on protection of population from infectious diseases (primarily only in the central part, and later in the whole of the Republic of Serbia) by improving the success of introducing the vaccine reduces the number of patients, however, the average in this area now 1-2 annually registered cases of the disease tetanus, and there are years when there was no single case of the disease. Comparing the first and last four five-year periods is striking that during the period 1953-1972. reported 308 patients with tetanus, or 75.9% of the total number of patients in the entire period from 1994th to 2013th only 24 or 5.9% of the total number of patients in the period 1953-2013. It is important to say that in recent years in the area of tetanus affects only older people, who have never been vaccinated (Table 1). From 1979 to the present are recorded only three cases of neonatal tetanus (1980 - 2 and 1993 - 1). It is also significant that even at ages that are regularly vaccinated (1-29 years old) from 1978 also recorded only 3 cases of illness (1982, 1990 and 1996 at a time). However occurrence of tetanus will be present and further, considering its epidemiological characteristics: they can not be rehabilitated tetanus courts, there are many sources of infection; and as, perhaps, the most important as the collective immunity does not protect the individual from becoming ill. However, changes to the legislation providing for revaccination of elderly (30, 40, 50 and 60 years of age) are likely to make the

disease less registers and in the elderly. However, as long as the non-vaccinated persons, there will be cases of contracting tetanus, and if immunization is still implemented with success, the disease will occur only individually, and even quite a few years, mostly in the elderly population.

Another children's infectious disease in which the reduction of morbidity are immunoprophylaxis achieved significant results is whooping cough. Pertusus was once widespread and ever-present children's infectious disease in this region. After a massive scale reporting occupied, approximately, second or third place among all infectious diseases (measles and influenza behind). Due to the high mortality that followed him occupied is also one of the first places among infectious diseases. The movement of pertussis in the Nis area during 1953 to 2013 shown in Figure 4. Because ease of presentation used is presenting the five-year period (Figure 5) with an average annual number of patients. Note the sudden drop in the number of cases of the sixties, with a tendency of continuous further decline, so that from 737.8 in the first two five-year observed (1953 to 1962) with an average incidence rate of 119.1 per 100 000 population, the average number of cases in period 1981 to 1990 fell to 21.8, even with an incidence of 3 per 100,000 inhabitants, and 0.7 for the period 2013 204.- (incidence of 0.2 per 100 000. Thus, while the prevaccinal period (vaccination as required systematic introduced here in 1961) the number of reported cases of the disease was by several hundred, after the introduction of compulsory immunization rapidly decreases, and in recent years was reported only after the case a year. However, pertussis is usually present as a disease of adults, because the vaccine immunity of limited duration, but the diagnosis of disease set only on the basis of clinical presentation without using laboratories. This problem could be solved by changing the calendar of vaccination by introducing immunization of adults against the disease as is done in some countries.

Given such a small number of patients in recent years it is difficult to say whether it is in this period of how to carry out compulsory systematic vaccination has been a change in some other epidemiological characteristics pertusisis, and which kind of, I large reduction in morbidity and mortality of absence, at least according to the this area can not be talking about it. In any case, the epidemiological situation of pertussis in this area is very satisfactory and assessed as favorable. If you continue to maintain the success of immunization at the current level (95-100 %), 2012 I II (92.2 % and 93.5 %) and epidemiological prognosis for this disease will be favorable.

Measles is a disease that according to their clinical aspect, the picture could be classified as mild disease, but because of the very high morbidity, complications and mortality that accompanies this disease (especially before the antibiotic period), represent a significant medical, social and biological problem. This is, roughly, a definition of measles in prevaccinal period. The number of patients in some series about the exact parameters, fit the annual population growth of our country, although the number of registered cases never showed nearly right balance. The introduction of compulsory systematic vaccination (in the low range was introduced in 1971) has led to significant changes in the movement of these children's diseases. Figure 6 shows trends in the incidence of measles in the Nis region in the period 1953 to 2013 per year and five-year periods, with an average annual number of patients (Figure 7). First of all you can see is the fact that with this disease has been a drastic reduction in the number of patients, but this disease has lost the leading position among infectious diseases in the region (and no more, not even in the top ten diseases registered by the amount of morbidity). Unfortunately, after a long period of time (2001 to 2013) when not registered a single case of illness 2011. There was an epidemic of the disease (70 patients), because the epidemic has spread from the Jablanica District. In an outbreak of measles 2010 - 2011 were registered 365 cases (the

total number of patients was 80% from the area of Jablanica, and 17% from the territory of Nis District). About 90% of patients were unvaccinated or incompletely vaccinated.

In prevaccinal period measles were disease of the youngest population, and it is there, and had the largest decrease morbidity. Vaccination has led to changes in the distribution number of cases of measles: if it is before and after the introduction of immunization compulsury average annual specific morbidity highest in the youngest age group (0-4 years), comparing these two periods can be clearly observed that the vaccination has led to the displacement illness to later age. The average annual rate of mortality at ages 0-4 years was reduced by 6.88 times, in a group of 5-9 years to more than 4.1 times, while the older children happens the other way around and population older than 15 years of being diagnosed more than prevaccinal period (Table 2). This is a result of the short duration of vaccine immunity, which lasts 7-10 years. This figure is significantly altered by the introduction of mandatory revaccination. Therefore, among patients with measles today, mostly unvaccinated, and those who were vaccinated more than ten years (and is introduced booster shot, first in the 12 year life, and since 2006, before school - means in the 7th year of life). In addition to reducing the average annual morbidity, vaccination has led to mortality not recorded in low-lying areas. The circular movement is still present, but you peaks epidemic waves all lower.

Due to this limited duration of vaccine immunity, but also the unsatisfactory coverage of the vaccine (for many years under the 95% of the planned number), and other epidemiological characteristics of measles today, the elimination of the disease will be much more gradual and more difficult than originally thought. WHO as a long-term objective provides for the elimination of indigenous measles, but it will not be able to carry out only by means of vaccines, but will require some additional strategies.

Epidemic parotit belongs to the group of mild viral disease, but its significance has in in complications that may arise in the course of the disease. With the introduction of vaccination against this disease in 1981 there was a significant decrease in the number of patients and the disease has lost its importance. Chart 8 shows trends in incidence parotita per year in the period 1976-2013. and the average number of patients per five-year periods (Figure 9). Immediately it should be noted that with this disease has been a drastic reduction in the number of patients, and is the disease and lost the leading position among infectious diseases in the region. While in the first five-year period 1976th-1980th recorded the average number of patients suffering from 1782.6 in the last reporting period 2009-2013 only 6.8. Parotit today affects mainly unvaccinated people. Cyclicality is still present, but the peaks of waves all lower and less frequent.

One of the youngest vaccination introduced in our country is rubella (1993). It is still early to talk about the results of the task that was set when the disease in question, and that is the reduction of congenital complications to 0.01 per 1000 live births. December 2006 adopted the Action Plan for the elimination of measles and prevention of congenital rubella syndrome (KRS) in Serbia due to limited time evaluation of this task is not yet done. In Chart 10 shows trends in the incidence of measles in the period 1976th-2013th, and is also used show petogodičnjih period (Chart 11) the average number of patients. Note the sudden drop in the number of cases in 1996, but the problem that exists in the regular vaccination and revaccination, and we can see here. And if the average annual number of patients in the last reporting period (2009-2013; Mb 1.12% 000) for about 201 time smaller compared to the first petogodišjem (1976 -1980; Mb 226.02% 000) looks we are far from the final objective. However, for more serious conclusions it is necessary to analyze the longer period and a more detailed analysis.

Although such an analysis requires much more time and space (perhaps even necessary and elaboration of some positions), based on the displayed and said, however, derive some conclusions:

1. Infectious diseases against which we conduct obligatory systematic immunization (vaccinable diseases) tend steady decline in incidence, mortality reduction or elimination, as well as maintaining lethality.

2. In the area once called Nis region (today Nisava, Toplica and Pirot district) a far greater number of patients registered to the introduction of compulsory systematic vaccination against certain diseases, and then was followed by, in some slowly, others quickly fall ill, while certain diseases effectively eliminated by (diphtheria) and eradicated (polio) in this area.

3. In some vaccinable disease there is a shift towards older age morbidity and limited duration of vaccine immunity increasing share of the total number of vaccinated patients.

4. Required systematic immunization must continue to be conducted with the increasing seriousness and high coverage of taxpayers, ie, should be immunized every child (except those with permanent contra-indication) at a time, ie. the age, as is provided for immunization calendar. This will not only maintain the results achieved, already you will be holy, rather humanity relieve some important infectious diseases.

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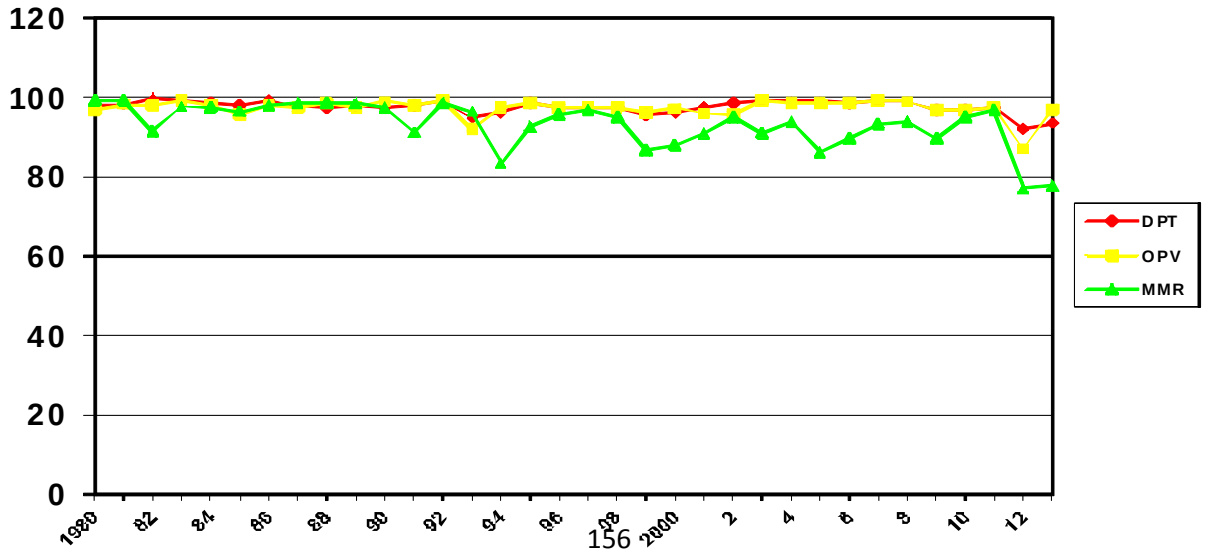
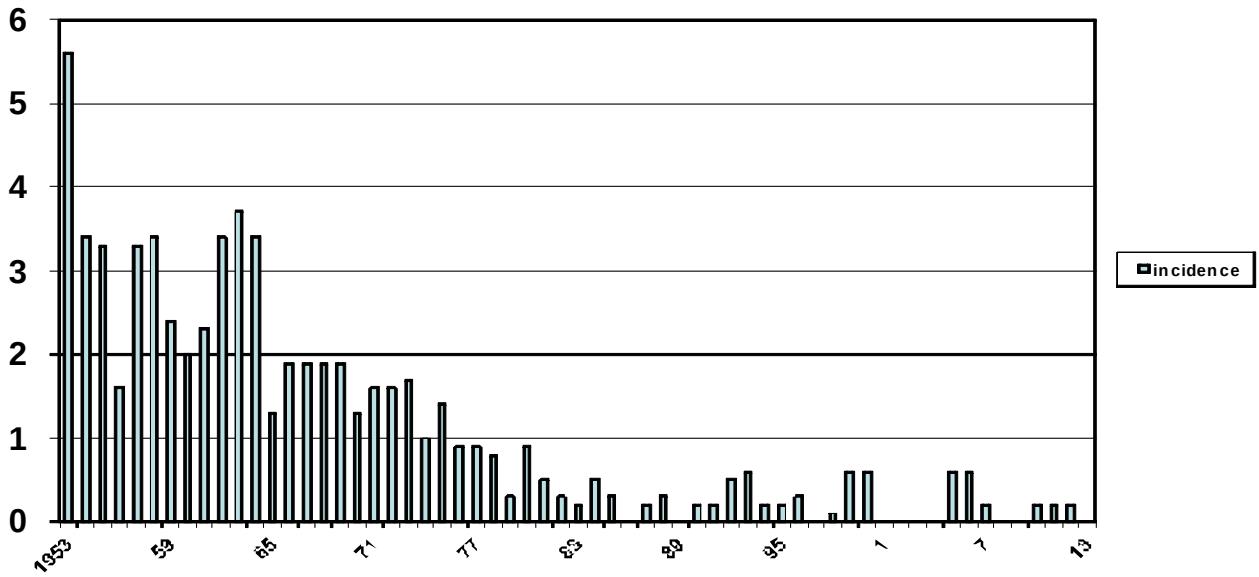
Appendices:

Graph 1. Immunization coverage in the area of Nisava, Toplica and Pirot district



Graph 2. Tetanus in the area of Nisava, Toplica and Pirot district



Graph 3. Tetanus in the area of Nisava, Toplica and Pirot district

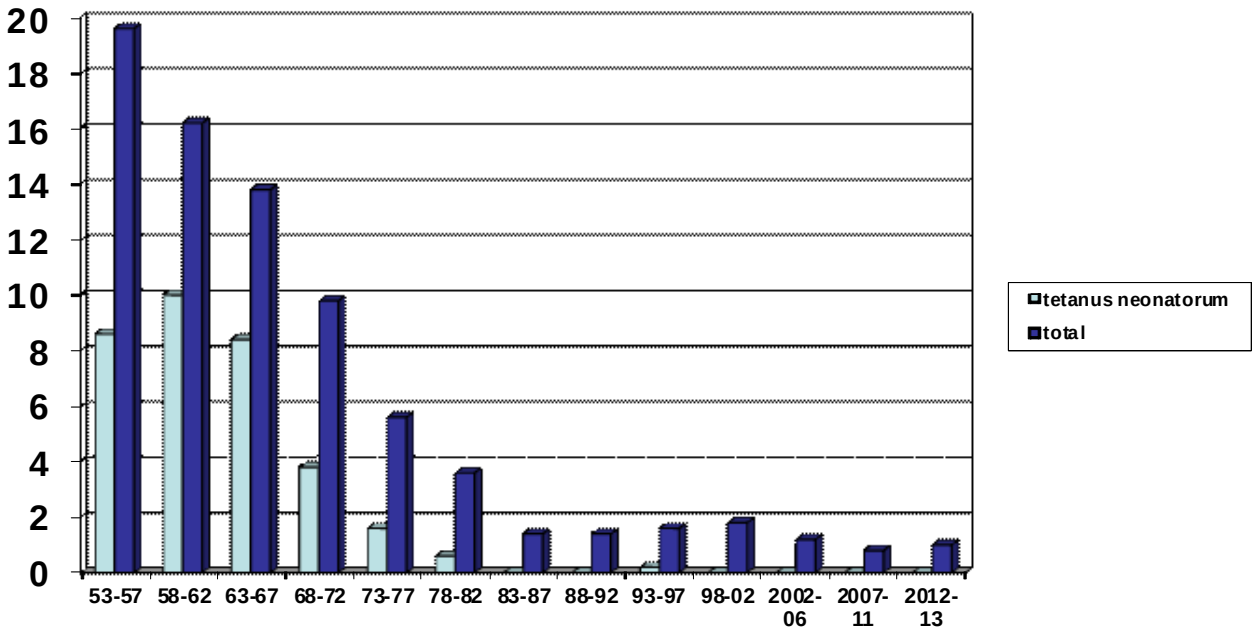
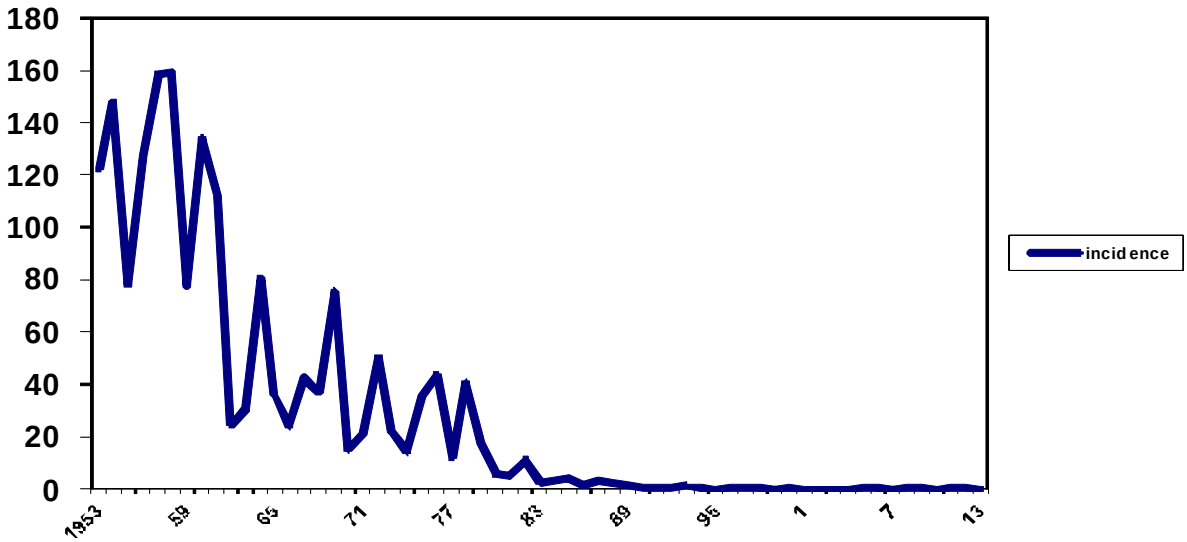


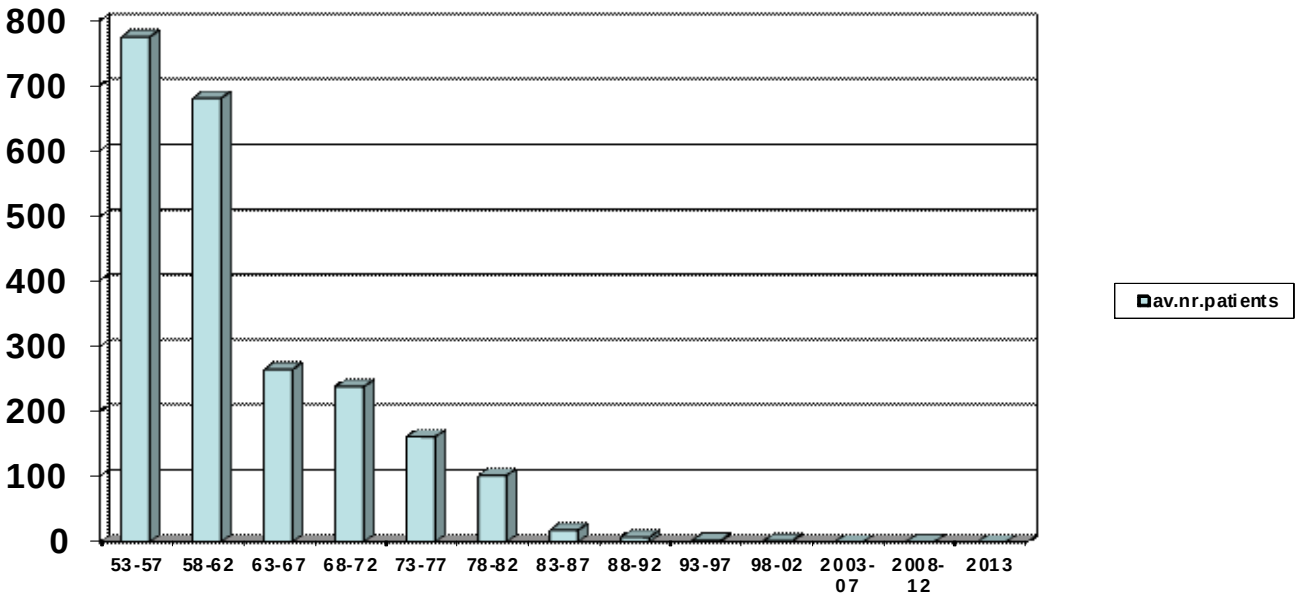
Table 1. Age suffering from tetanus in the area of Nis, Toplica and Pirot in the period 1980-2013

Age groups									
0	1-4	5-9	10-14	15-19	20-29	30-39	40-49	50-59	60+
3	-	1	-	-	2	1	3	7	34

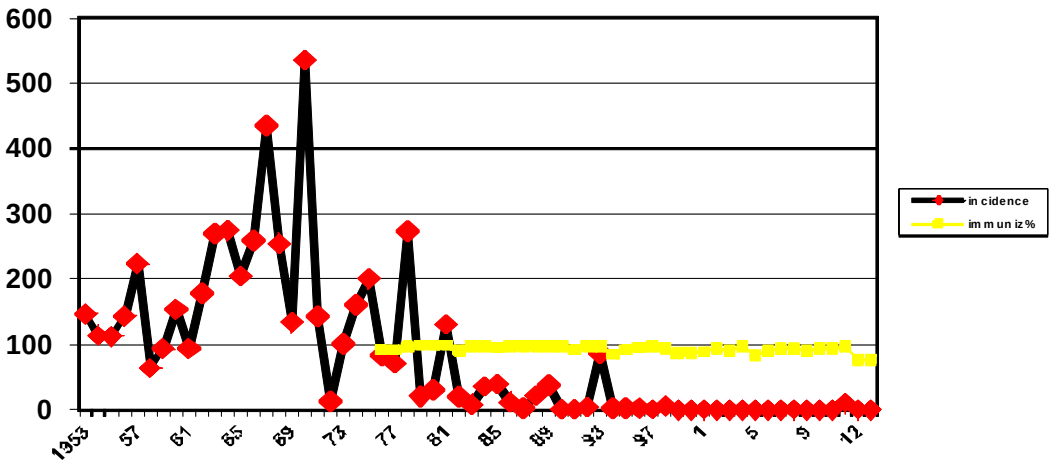
Graph 4. Pertusiss in the area of Nisava, Toplica and Pirot district



Graph 5. Pertusiss in the area od Nisava, Toplica and Pirot district



Graph 6. Measles in the area of Nisava, Pirot and Toplica District



Graph 7. Measles in the area of Nisava, Toplica and Pirot district

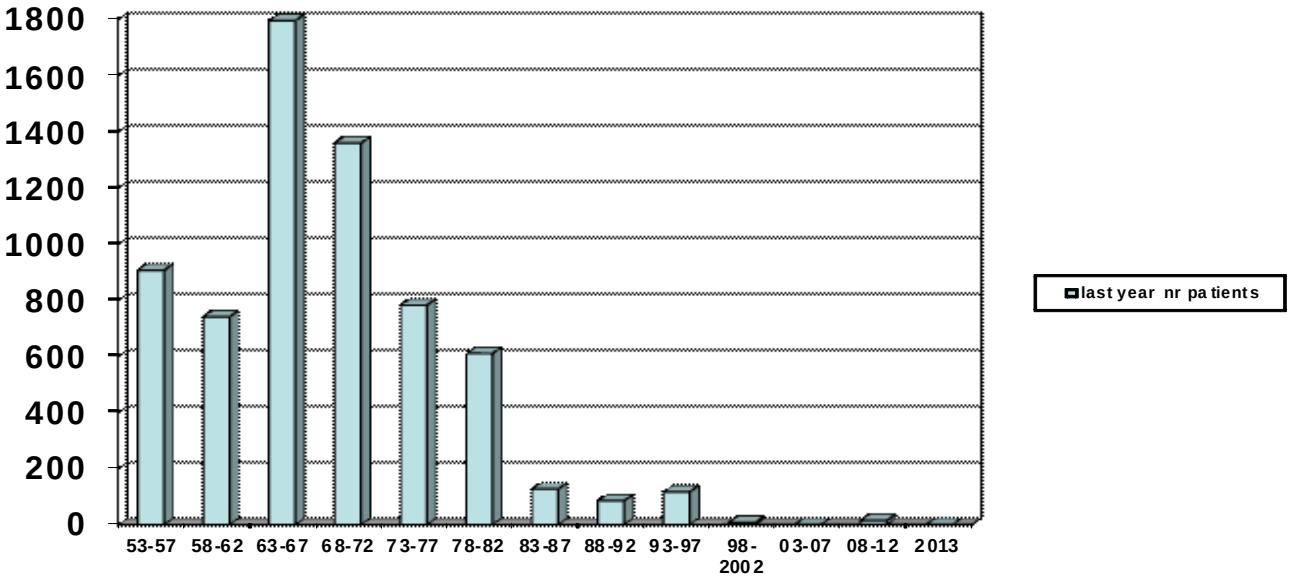
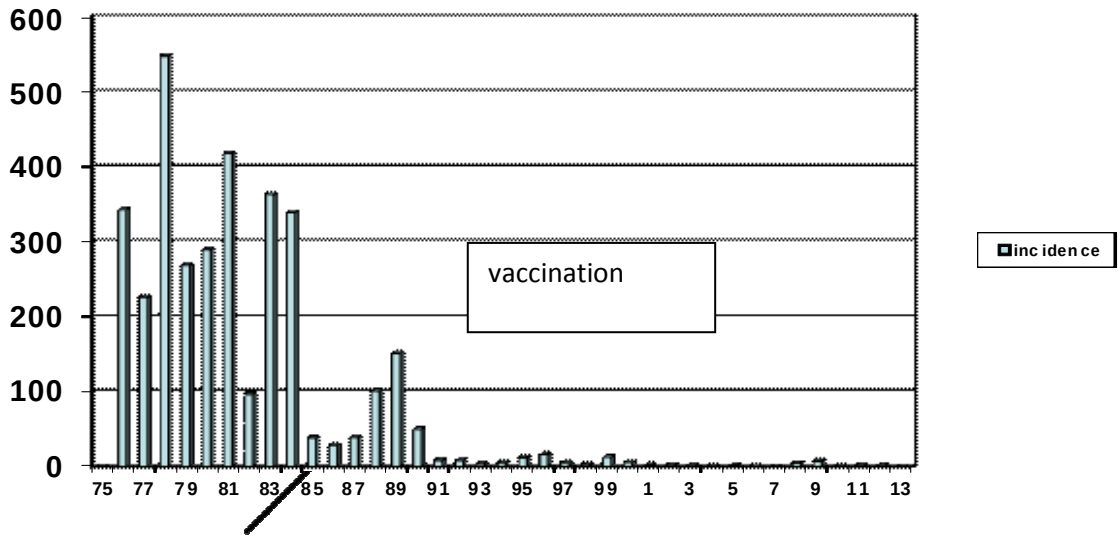


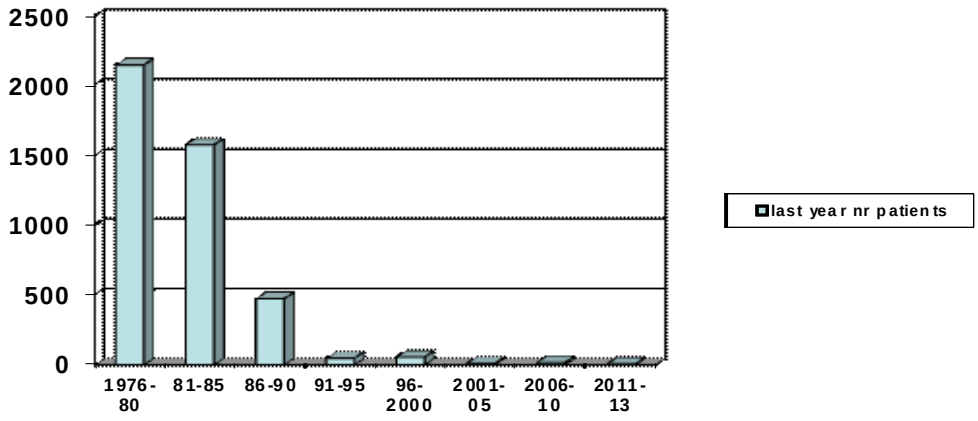
Table 2. Specific average annual morbidity from measles in the area of Nisava, Toplica and Pirot district

Period	Age groups				
	0-4	5-9	10-14	15-19	20 and more
1958-71	1673,7	765,06	126,15	13,84	1,14
1972-13	243,26	183,26	103,36	37,29	1,23

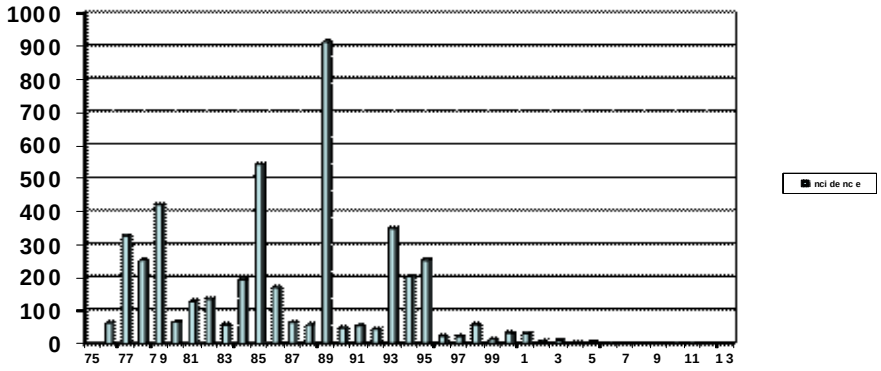
Graph 8. Mumps in the area of Nisava, Toplica and Pirot District



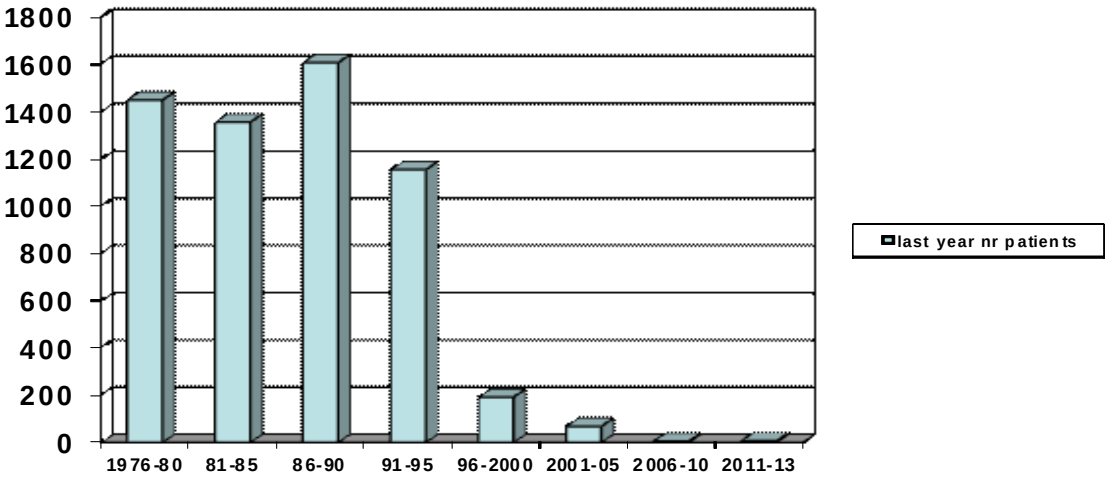
Graph 9. Mumps in the area of Nisava, Toplica and Pirot District



Graph 10. Measles in the area of Nisava, Toplica and Pirot District



Graph 11. Mumps in the area of Nisava, Toplica and Pirot District



ORAL PRESENTATIONS

1. THE PLACE AND ROLE OF IMMUNIZATION IN PREVENTION OF HOSPITAL ACQUIRED INFECTIONS

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2. INFECTIOUS DISEASES IN SERBIAN AREAS OF KOSOVO AND METOHIJA

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Objective: Identification of the epidemiological characteristics of infectious diseases in Serbian areas of Kosovo and Metohija.
Material and Methods: In this paper we used epidemiological study design (cross-sectional). As a material for the best consideration of the size of the problem of infectious diseases we used the data from monthly and annual reports on infectious diseases of the Institute of Public Health of Pristina based in Kosovska Mitrovica.
Results: The survey covered a period of 5 years (2010-2014.). In the reported period in Serbian areas of Kosovo and Metohija was a total of 5799 patients with infectious diseases, with 14 deaths. The highest incidence rate (852,88 / 100,000) was recorded in 2013. and the highest mortality rate (3,85 / 100,000) in 2014. In the structure of infectious diseases, respiratory infectious diseases occupy first place with 3339 applicants (57.6%) and the predominant share of varicella with 2706 patients. The largest number of patients and the highest incidence rate in the group of respiratory infectious diseases, 1032 (663.28/ 100,000) were registered in 2013. During this period 100 (1.7%) patients were reported, suffering from diseases preventable with vaccines, where mumps (69%) had the largest share. For the same period there were registered 11 outbreaks with 97 patients and 4 deceased.
Conclusion: Infectious diseases, especially respiratory infectious diseases, in Serbian areas of Kosovo and Metohija represent a significant public health problem and should be worked to strengthen preventive measures.
Key words: infectious diseases, Kosovo and Metohija, the incidence.

3. OUTBREAK OF MEASLES IN THE AUTONOMOUS PROVINCE OF VOJVODINA, (2014 / 2015)

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Objectives: To describe the measles outbreak, in the Autonomous Province of Vojvodina (2014/2015) and to define conditions that contributed to its occurence.

Materials and methods: The descriptive method was used.

Results: A total of 93 measles cases were identified in Vojvodina in the period November 14 th 2014. - April 04, 2015.

Outbreak of measles in AP Vojvodina was probably linked with the ongoing outbreak of measles in Republica Srpska, but importation status will be confirmed after analysis of results of the measles virus genotyping. Most of the cases had unknown immunization status.

Conclusion: Importation of the virus into the susceptible population, the decline in immunization coverage, the absence of seroepidemiological studies and timely supplementary immunization as well as unfavorable epidemiological situation of measles in the region, resulted in the outbreak of measles in AP Vojvodina.

Key words: measles, outbreak, immunization, importation, coverage

4. NEW METHODS FOR EARLY DETECTION AND ORIENTATION AND FOR SUBTLE AND DETAILED DIFFERENTIATION OF THE EPIDEMIC – EXAMPLE: *ESCHERICHIA COLI* O104:H4 OUTBREAK IN GERMANY IN 2011

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Background: In 2011, Germany was hit by one of its largest outbreaks of acute gastroenteritis and haemolytic uraemic syndrome caused by a new emerging enterohaemorrhagic ***Escherichia coli*** O104:H4 strain. The German Haemolytic Uraemic Syndrome/Enterohaemorrhagic ***E. coli*** (GHUSEC) outbreak had unusual microbiological, infectiological and epidemiological features and its origin is still only partially solved. The aims of these methods were to contribute to the clarification of the origin of the epidemic. **Methods**: To retrospectively assess whether the GHUSEC outbreak was natural, accidental or a deliberate one, we analysed it according to three published scoring and differentiation models. In second step we use an original and detailed scoring method, with 33 parameters pertaining to the source of infection/reservoir or possible perpetrator, pathogen or biological agent, transmission mechanism/factors or means/media of delivery, and population at risk or target. **Results**: The analysis of the unusual GHUSEC outbreak shows that the present official assumption of its natural origin is questionable and pointed out to a probability that the pathogen could have also been introduced accidentally or intentionally in the food chain. **Conclusion**: The possibility of an accidental or deliberate epidemic should not be discarded. Total scores indicate that the outbreak was more probably caused unintentionally, presumably due to technical accidents or hygienic shortcomings in the food chain.

5. EVOLUTION OF TREATED HCV INFECTIONS IN HEMOPHILIA PATIENTS

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Objective: Hemophilia is a hereditary blood coagulation disorder. The presence of HCV infection is often noticed in these patients; it can be acute or chronic.
The aim of the research is monitoring of the HCV infection evolution in treated hemophilia patients.
Methods: We followed 21 male hemophilia patients, aged 10 to 45. There was no presence of HCV infection in 5 patients, 2 were anti-HCV positive and PCR HCV RNA negative, in 14 patients anti-HCV and PCR HCV RNA different genotypic backgrounds were detected.
Results: All patients were treated with dual therapy (pegylated interferon and ribavirin): 12 show a stable virological response (SVR), in two there is no satisfactory answer. 10 patients with SVR continued a normal life, one had hepatocellular carcinoma (HCC), the other is HIV positive. Patients with negative virological response were subjected to triple therapy with partial success.
Conclusion: For the patients with HCV therapeutic and post treatment monitoring is required.
Keywords: hepatitis C, hemophilia, hepatocellular cancer, HIV, treatment

6. USING FMEA (FAILURE MODE EFFECTS ANALYSES) METHOD IN THE PREVENTION AND CONTROL OF HOSPITAL INFECTIONS

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Aim: Display use of FMEA in some case studies conducted in several countries, showed
that this inovative method can be used in the prevention and control of hospital infections. It is based on registrated errors, during implementation of different diagnostic and therapeutic procedures.
Method: FMEA is a systematic proactive method for evaluating processes. This method identifies the place and manner where an error in the process can arise and assess the relative influence of various errors, in order to remove parts of the process that are most risky.FMEA requires a detailed description of each step in the process, causes, effects and RPN (Risk Priority Number). For the implementation of methods it is necessary to form a team who identifies all possible failures, the causes, effects, error frequency, the level of detection and the severity of errors. For each critical step in the process, it is to be made a plan for the reduction of the RPN's.
Result: Application of FMEA method identifies and reduces the risk of errors occurs during implementation of different diagnostic and therapeutic procedures. Some studies showed decrease of the incidence (up to 40%) of hospital infections.
Conclusion: FMEA method is used for the identification and reduction of risk of errors during implementation of different diagnostic and therapeutic procedures.
Keywords: FMEA, hospital infection, risk factors

POSTER PRESENTATIONS

1. VARICELLA–DOMINANT RESPIRATORY DISEASE IN THE REGION OF GOSTIVAR – PERIOD 2008-2014

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Private Health Institution „Dr Katerina“ Gostivar

Purpose: The purpose of this presentation is to show the epidemiological characteristics of the most common respiratory disease –varicella in the region of Gostivar for the period 2008-2014.
Material and metod: Material used for working are individual apllications for infectious diseases, reports, newsletters and information prepared in epidemiological department of the regional office in Gostivar.
A descriptive epidemiological and statistical method is used for processing the material.
Results: In the period 2008-2014, varicella disease is dominated over the other respiratory diseases.Its percentage is ranged from 24,7 % in 2009, 65,6 % in 2011, 77,4 % in 2012 to 84,1% in 2013. In the researched period are registered 1022 patients of which 572 male or 55,9 % and 450 female or 44,1 %. Most patients are of school age- 579 or 56,6 % and then preschooler -355 patients or 34,7 %.
The disease has a pronounced seasonal character with a maximum of patients in the months of November, December and January. There were also small cyclical fluctuations of 2 years in the appearance of varicella.
Conclusion: Varicella is a disease of childhood and most of the children are infected to the age of 15.
The application of general measures of prevention is with no greater success.
The application of obligatory vaccination against the disease is the best measure of protection.
Keywords: varicella, dominant, respiratory, disease, vaccine.

2. HEPATITIS A REGISTERED CASES IN MONTENEGRO DURING THE PERIOD 2005-2014

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Introduction: Hepatitis A is an acute infectious disease caused by the hepatitis A virus, characterized by inflammation of the liver and typical biochemical changes in serum.
Aim: Exploring epidemiological characteristics of hepatitis A in Montenegro for the reffering period.
Materials and Method: Descriptive epidemiological method was used for this study. Data sources were communicable diseases' notification records and epidemiological case histories and microbiological confirmation of diagnosis.
Results: During the observation period 327 hepatitis A cases were registered, average incidence rate 5,27/100000. Higher incidence rate was registered in: Ulcinj (13,05/100000), Budva (9,89/100000), Berane (8,54/100000), Bar (8,09/100000) and Cetinje (8,40/100000). Higher incidence rate was registered in preschool and school aged children (age: 0-4 - 5,13/100000, age: 5-19 - 11,62/100000), constituting over 50% of all cases. Most of the cases were registered in November and December, with equal morbidity in both sexes. Five family outbreaks with 27 cases were registered during the referring period - 8% of all registered cases.

Conclusion: Hepatitis A occurs in sporadic and endemic-epidemic forms in Montenegro, most commonly transmitted through contact. Seroprevalence increases with age. Improvement of sanitation, hygiene and specific prevention by epidemiological indications have reduced morbidity from hepatitis A.

Key words: Hepatitis A, Epidemiology, Incidence, Montenegro

3. MORBIDITY OF THE VIRAL MENINGITIS IN MONTENEGRO FOR THE PERIOD 2005-2014

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Introduction: Viral meningitis is an inflammation of the soft meninges, caused by different viruses, with mild clinical picture and good prognosis. Enteroviruses have caused about 50% etiologically proven viral meningitis.
Materials and Method: The aim of this descriptive epidemiological study was to analyze the morbidity of viral meningitis in Montenegro for period 2005-2014. In the analysis of the data we used crude incidence rates and descriptive statistics.
Results: In the analyzed period, in Montenegro were registered 448 persons affected by viral meningitis, with an average incidence rate of 7,23/100 000. The incidence ranges in value from 0,80/100 000 in 2014, up to 30,48/100 000 in 2008. Higher average rate of incidence was registered in: Danilovgrad (140,75/100 000), Kotor (18,14/100 000) and in Podgorica (10,97/100 000). In the age group of school and preschool children the higher average incidence rate was registered (5-19 year – 19,94/100 000; 0-4 year – 21,82/100 000), which represents 74% from total number of registered morbidity. The highest number of patients (83,3%) was registered from April to November. In the observed period the epidemic occurrence of the disease was registrated (in 2008), with an incidence of 30,48/100 000 and with an identified cause - enterovirus ECHO6.
Conclusion: Viral meningitis in Montenegro occurs sporadically and has a seasonal character. Due to lack of immunity the most vulnerable are children. By keeping good habits of personal and general hygiene the risk of infection and the disease reduces.

4. OCCURRENCE OF ANTHROPOZOONOSIS DUE TO CATASTROPHIC FLOODS

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Introduction: Republic of Srpska was affected by severe flooding in May, 2014. Sanitary-Epidemiological Services conducted emergency measures in order to prevent the epidemic of infectious diseases.
Objective: To determine if there was an increase in the number of cases during 2014, as a result of the emergency situation due to flooding.
Methods: This paper represents a retrospective study of received and registered data regarding anthropozoonosis cases, from 2009-2014. The paper used gathered data from the Bulletin of illness and mortality rates from infectious diseases and Public Health publication, from Public Health Institute RS. During the data analysis, we used an estimated population number of RS and Banja Luka region.
Results: From 2009 to 2013 in RS, the anthropozoonosis incidence rate was 2,2-9,2/100000; whereas in 2014 during the catastrophic floods it was 11,6. In Banja Luka region, which was almost entirely devastated by the floods, the incidence rate in 2013 was 16,3/100000; in contrast to the period from 2009-2013 when it was 3,1-11,3/100000. The noticed increase of cases did not have an epidemic character.
Conclusion: As a result of methodically and timely conducted preventive and anti-epidemic measures in Banja Luka region, which was affected by the floods, there were no epidemic cases of anthropozoonosis.
Key words: anthropozoonosis, floods, emergency measures

5. EPIDEMIOLOGICAL CHARACTERISTICS OF TRICHINELLOSIS IN AUTONOMOUS PROVINCE OF VOJVODINA IN THE PERIOD 2005-2014

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Objective: Trichinellosis is a zoonotic infectious disease, caused by a roundworm of the Trichinella genus. The aim of this paper was to analyze chronological, topographic and demographic distribution of trichinellosis in Autonomous Province of Vojvodina in the period from 2005 to 2014.
Methods: Descriptive method was applied. The epidemiological characteristics were analyzed based on individual case reports, outbreak reports and epidemiological surveys, obtained from the Registry of Communicable Diseases, kept at the Center for Disease Control and Prevention, Institute of Public Health of Vojvodina.
Results: In the 10-year period, 724 cases of trichinellosis were reported in AP of Vojvodina, with average annual incidence rate 3,6/100 000. It affects people of both sexes and all age groups, but more often men and middle-aged population, bacuse of higher exposure to infested meat. High percentage of cases (43,4%) were hospitalised. Most of cases were registered in outbreaks (96,8%). The family outbreaks are dominated, but there is increasing trend of outbreaks originating from private and illegal production of meat.
Conclusion: Trichinellosis is still considered as a public health problem. It is necessary to improve health education of the population, in addition to application of the existing legal measures.
Key words: Trichinellosis, zoonosis, outbreaks, epidemiology.

6. AN OUTBREAK OF SYPHILIS AMONG MEN WHO HAVE SEX WITH MEN IN BELGRADE, SERBIA IN 2014

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Objectives: The purpose of this study was to analyze the epidemiological situation of syphilis in the Belgrade population during the period 2005-2014 and the characteristics of an outbreak of early syphilis among men who have sex with men (MSM) in Belgrade in 2014.
Materials and methods: Data on the number of cases with syphilis and their epidemiological characteristics were obtained from the City Institute for Public Health and Institute for Infectious and Tropical Diseases in Belgrade. Crude, specific and standardized incidence rates of syphilis were calculated. In the analysis of data χ^2 test was used.
Results: During the period 2005-2014, incidence rate increased from 1.07 per 100,000 in 2005 to 4.1 per 100,000 in 2014. In 2014 primary syphilis was diagnosed in 20 cases, 42 patients had secondary syphilis, and 9 cases were classified as early latent syphilis. Fifty seven (85.1%) were MSM, 10 were heterosexual men and 4 were women. 24 cases, all MSM being co-infected with HIV. Majority of cases acquired infection in Belgrade, and in 42/71 cases oral sex was the only risk factor. HIV positive syphilis cases were slightly older (p=0.0129), unemployed (p=0.0000), homosexual (p=0.0000), had sex with unknown partners (p=0.0224) and were diagnosed in the secondary stage of infection (p=0.0006).
Conclusions: This outbreak among MSM demonstrated the need for enhanced prevention methods. Condom use for oral sex should be an important part of patient counseling.
Key words: syphilis, oral sex, men who have sex with men, HIV

Session: Theoretical and practical problems of non-communicable diseases epidemiology

TOPIC: THEORETICAL AND PRACTICAL PROBLEMS OF MASS CHRONICAL NON-COMMUNICABLE DISEASE EPIDEMIOLOGY

INVITED LECTURES

1. INVESTIGATION OF QUALITY OF LIFE IN MEDICINE AND IT'S IMPORTANCE FOR PUBLIC HEALTH

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Introduction: Quality of life (QOL) is a broad multidimensional concept that usually includes subjective evaluations of both positive and negative aspects of life. What makes it challenging to measure is that, although the term "quality of life" has meaning for nearly everyone and every academic discipline, individuals and groups can define it differently. Although health is one of the important domains of overall quality of life, there are other domains as well for instance, jobs, housing, schools, the neighborhood (1).
Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (2).
The medical literature the term "quality of life" was mentioned for the first time in 1966 in a paper called "Health and quality of life" which was published by J. Elikinton in the Annals of Internal Medicine. According to this author quality of life is harmony within man as well as the harmony between man and his world (3).
In the broadest sense, **quality of life** is everything that makes life worth living. In the **"Quantitative sense,"** that is the estimate of the remaining duration of life devoid of damage, disability or disability (4).
In the medical literature there are two terms of the quality of life. Overall quality of life (Overall quality of life/ Quality of life-QOL).Health-related quality of life-HRQL. However, despite its burgeoning popularity as an outcome measure, research continues to be hampered by a lack of conceptual clarity regarding precisely what is meant by QOL (2-5).
The review focused on the assessment of HRQL in medicine.
Despite the widespread use of the phrase, there is no consensus on the definition of the concept of HRQL, though definitions usually refer to physical, emotional and social well-being. HRQL is a distinct construct which refers to the impact that health conditions and their symptoms have on an individual's quality of life, and, in the context of healthcare, the term HRQL is preferred over quality of life because the focus is on health. It provides a common benchmark against which can be measured the impact of different experiences and treatments for the same condition or the impact of different treatments across different conditions (6).
As a consequence, HRQL instruments have evolved in order to assess the impact of disease, effect of treatment and other variables affecting people's lives. They provide an assessment of the patient's experience of his or her health problems in areas such as physical function, emotional function, social function, role performance, pain and fatigue. Thus, HRQL can be defined as health status and viewed as a continuum of increasingly complex patient outcomes: biological/physiological factors, symptoms, functioning, general health perceptions and overall wellbeing or quality of life (7).
While healthcare professionals may be more interested in changes in objective physical measures, patients (and family members/carers) equally interested in a therapy that changes their symptoms, physical function and social roles. HRQL instruments measure the effects of treatment on aspects where patients are continuously concerning about. Because these instruments describe or characterize what the patient has

experienced as a result of healthcare, they are useful and important supplements to traditional physiological or biological measures of health status (5-8).

The concept of health-related quality of life (HRQOL) and its determinants have evolved since the 1980s to encompass those aspects of overall quality of life that can be clearly shown to affect health—either physical or mental. On the individual level, this includes physical and mental health perceptions and their correlates—including health risks and conditions, functional status, social support, and socioeconomic status. Self-assessed health status also proved to be more powerful predictor of mortality and morbidity than many objective measures of health (9-10).

HRQOL measures make it possible to demonstrate scientifically the impact of health on quality of life, going well beyond the old paradigm that was limited to what can be seen under a microscope. Measuring HRQOL can help determine the burden of preventable disease, injuries, and disabilities, and it can provide valuable new insights into the relationships between HRQOL and risk factors. Measuring HRQOL will help monitor progress in achieving the nation's health objectives. Analysis of HRQOL surveillance data can identify subgroups with relatively poor perceived health and help to guide interventions to improve their situations and avert more serious consequences (10).

HRQL instruments are either 'generic' or 'disease-specific' (11). Generic instruments address multiple aspects of quality of life across a range of different patient or disease groups. Thus, they focus on general issues of health (or ill health) rather than specific features of a particular disease: the role of disease-specific instruments (11). Because disease-specific instruments comprise content specific to the disease in question they are more clinically sensitive and potentially more responsive in detecting change (12).

Each type has its own particular strengths and weaknesses and there is some merit in combining both.

HRQOL assessment is a particularly important public health tool for the elderly in an era when life expectancy is increasing, with the goal of improving the additional years in spite of the cumulative health effects associated with normal aging and pathological disease processes (13).

Several measures have been used to assess HRQOL and related concepts of functional status. Among them are the Medical Outcomes Study Short Forms (SF-12 and SF-36), the Sickness Impact Profile, and the Quality of Well-Being Scale. The SF-36 measures are now used by the Health Care Financing Administration (HCFA) and the National Committee for Quality Assurance's Health Plan Employer Data and Information Set (HEDIS 3.0) to help evaluate the quality of care in managed care plans and other health care applications (14).

While these measures have been widely used and extensively validated in clinical settings and special population studies, their length often makes them impractical to use in population surveillance.

Conlusion: As knowledge builds about HRQOL surveillance and its potential uses, the measures and accumulating population data give states and communities a unique nationwide standard for identifying and tracking perceived unmet health needs and disparities.

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2. EPIDEMIOLOGY, RISK FACTORS AND PRIMARY PREVENTION OF DIABETES MELLITUS

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Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction, and failure of various organs, especially the eyes, kidneys, nerves, heart, and blood vessels [(1)].

There are two principle forms of diabetes [(2)]:

Type 1 diabetes (formerly known as insulin-dependent) in which the pancreas fails to produce the insulin which is essential for survival. This form develops most frequently in children and adolescents, but is being increasingly noted later in life.

Type 2 diabetes (formerly named non-insulin-dependent) which results from the body's inability to respond properly to the action of insulin produced by the pancreas. Type 2 diabetes is much more common and accounts for around 90% of all diabetes cases worldwide. It occurs most frequently in adults, but is being noted increasingly in adolescents as well.

Certain genetic markers have been shown to increase the risk of developing Type 1 diabetes. Type 2 diabetes is strongly familial, but it is only recently that some genes have been consistently associated with increased risk for Type 2 diabetes in certain populations. Both types of diabetes are complex diseases caused by mutations in more than one gene, as well as by environmental factors [(2)].

Gestational diabetes

Gestational diabetes is hyperglycaemia with blood glucose values above normal but below those diagnostic of diabetes, occurring during pregnancy. Women with gestational diabetes are at an increased risk of complications during pregnancy and at delivery. They are also at increased risk of type 2 diabetes in the future. Gestational diabetes is diagnosed through prenatal screening, rather than reported symptoms [(3)].

Impaired glucose tolerance (IGT) and impaired fasting glycaemia (IFG)

Impaired glucose tolerance (IGT) and impaired fasting glycaemia (IFG) are intermediate conditions in the transition between normality and diabetes. People with IGT or IFG are at high risk of progressing to type 2 diabetes, although this is not inevitable [(3)].

EPIDEMIOLOGY

Diabetes is one of the most frequent chronic noncommunicable diseases and it is a major public health problem. The World Health Organization – WHO and the International Diabetes Federation – IDF, estimate that in 2014, 387 million people worldwide suffer from diabetes, and that the number of diabetics will increase up to 592 million by the year 2035. Although the highest incidence rates are registered in the developed counties, the largest increase of number of people with diabetes is expected in the developing countries, to which our country actually belongs [(4, 5)].

In 2014 the global prevalence of diabetes was estimated to be 9% among adults aged 18+ years. In 2012, an estimated 1.5 million deaths were directly caused by diabetes. More than 80% of diabetes deaths occur in low- and middle-income countries. WHO projects that diabetes will be the 7th leading cause of death in

2030. In 2014, 9% of adults 18 years and older had diabetes. In 2012 diabetes was the direct cause of 1.5 million deaths. More than 80% of diabetes deaths occur in low- and middle-income countries [6].
According to Institute of Public Health of Serbia data it is estimated that in Republic of Serbia without Kosovo and Metohija (hereinafter: Serbia) approximately 710,000 persons or 12.4% of adult population suffer from diabetes [7], which corresponds to comparative prevalence 9,9% [4]. The number of persons with type 2 diabetes is much higher (95%) than of those with type 1 diabetes [4]. Thereby, according to the estimation of the domestic experts and on the basis of the results of international studies, 36% of the persons with type 2 diabetes have not been diagnosed and are not aware of their disease [8,9,10]. Diabetes prevalence grows with age, and it is estimated that almost a half of diabetic patients are over 65 years of age [11]. In the elderly, type 2 diabetes is diagnosed relatively late, when numerous cardiovascular complications are already present. In Serbia, as in the developed countries worldwide, diabetes is the fifth leading cause of death [12] and the fifth cause of the burden of disease [13]. In our country, approximately 2500 persons [12] die from this disease each year. In 2014, on the basis of a standardized mortality rate of 12.6 per 100 000 population, Serbia belonged to the group of European countries with the highest diabetes mortality rates [14]. It should be born in mind that the number of deaths is even higher, because of the errors in coding the causes of death and recording the diabetes as antecedent, instead of underlying main cause of death, particularly in those who died from infarction, stroke, and chronic renal failure [15,16].
The prevalence rate in the world is quite different, and it is estimated that amounts to 1-2% [17,18]. The highest prevalence rates were found in Pima Indians (34.1%) and people in Nauru in Micronesia (30.3%). The lowest prevalence rates were found with the Eskimos, less than 2%, among the population in Alaska, the Indian subcontinent (1.2% to 2%) and the Far East (Japan-1%, China-Shanghai-1.6%) in Australia 2.3% and New Zealand 2.8%. It is believed that in Papua Indians (New Guinea) from about 0% [19]. The prevalence rate in the developed countries ranges from 2 to 7%, and in Europe, from 0.5 to 3%. European countries have the highest rates of prevalence in Malta (3.9%) [20]. On the American continent, the prevalence ranges from 1% in the Mapuche Indians over the age of 20 years, to about 50% at the Pima Indians of the same age [21,22].
Non-insulin-dependent diabetes mellitus is one of the most common serious diseases of certain ethic groups, including many American Indian tribes. Pima Indians of Arizona, have the highest recorded prevalence and incidence of non-insulin-dependent diabetes mellitus of any geographically-defined population [23].

Non-insulin-dependent diabetes mellitus is one of the most common serious diseases of certain ethic groups, including many American Indian tribes. Pima Indians of Arizona, have the highest recorded prevalence and incidence of non-insulin-dependent diabetes mellitus of any geographically-defined population [23].

RISK FACTORS AND PREVENTION

There are a number of factors that contribute to a person's overall likelihood of developing type 2 diabetes and heart disease. Modifiable risk factors include: Overweight/Obesity, High Blood Glucose, Hypertension, Abnormal Lipid Metabolism, Physical Inactivity, Smoking [24].

Overweight/Obesity

For many patients, weight loss can be a struggle because it means substantial changes in eating and exercising habits. These can be some of the hardest habits to change, and there is no "one size fits all" or quick fix.

Have a frank, open discussion with your patient about their risk for diabetes and CVD. Explain how even just a small weight loss could have a big impact on their health, quality of life, and on the length of their life. If they have other cardiometabolic risk factors, they should know that losing weight can help manage blood pressure and cholesterol, among others [(24)].

Clinical Intervention [(24)]:

Measure BMI routinely at each regular check-up.

Table 1. Measure BMI

	BMI
Normal	18.5-24.9
Overweight	25-29.9
Obese	>30

Recommend & counsel for lifestyle modification.

- Reduce calorie intake.
- Increase physical activity.
- Remind patients that even a small calorie deficit will lead to weight loss. A deficit of 100 calories per day leads to a 10 pound weight loss over a year.
- Consider pharmacologic treatment.
- Patients can calculate their own BMI

High Blood Glucose

High blood glucose is a substantial risk factors for diabetes and in the long run, heart disease and stroke. The American Diabetes Association recommends using one of three testing methods [(24)].

Table 2. Measure Glucose

	A1C	**Fasting Plasma Glucose (FPG)**	**Oral Glucose Tolerance Test (OGTT)**
Normal	< 5.7%	< 100 mg/dl	<140 mg/dl
Prediabetes	5.7%-6.4%	100 mg/dl to 125 mg/dl	140 mg/dl to 199 mg/dl
Diabetes	6.5% or higher	126 mg/dl or higher	200 mg/dl or higher

Clinical Intervention [(24)]:

Patients with prediabetes should be referred to an effective ongoing support program targeting weight loss of 7% of body weight and increasing physical activity to at least 150 min/week of moderate activity, such as walking.

- Follow up counseling appears to be important for success.
- Metformin therapy for prevention of type 2 diabetes may be considered in those with

impaired glucose tolerance (IGT), impaired fasting glucose (IFG), or an A1C 5.7-6.4%, especially for those with BMI > 35 kg/m^2, aged <60 years, and women with prior gestational diabetes.

Hypertension

Hypertension leads to elevated risk for myocardial infarction, stroke, eye problems and kidney disease. Often a silent disease, many patients won't know they have high blood pressure until informed by their health care provider [(24)].

For patients without diabetes:

- Blood pressure should be measured at each regular visit or at least once every 2 years if it is less than 120/80 mmHg.
- Blood pressure should be measured while seated after 5 min rest in office.

For patients with diabetes:

- Blood pressure should be measured at each regular visit
- Patients with elevated blood pressure should have blood pressure confirmed on a separate day

Table 3. Measure of Blood Pressure

	Goal
Systolic	<140 mmHg
Diastolic	<80 mmHg

Clinical Intervention [(24)]:

Patients with blood pressure >120/80 mmHg should be advised on lifestyle changes to reduce blood pressure.

DASH (Dietary Approaches to Stop Hypertension) diet

- Diet high in whole grains, vegetables, fruits, and low-fat dairy
- Lean meats and nuts
- Diet low in saturated and trans fat, cholesterol
- Increased physical activity
- Weight loss, if applicable

Abnormal Lipid Metabolism

Inform patients of the health risks of both high LDL cholesterol and low HDL cholesterol, as well as triglycerides. Patients should also be aware that modest weight loss and increased physical activity can have a beneficial effect on lipid management [(24)].

Table 4. Measure of Lipids

	Goal
LDL	<100 mg/dL
HDL	> 50 mg/dL
Triglycerides	< 150 mg/dL

Clinical Intervention:
Lifestyle modification [24]:

Reduce saturated fat, trans fat, and cholesterol intake

- Increase of fatty acids
- Increase fiber intake
- Lose weight (if indicated)
- Increase physical activity

Physical Inactivity
Staying active can [24]:

- Increase insulin sensitivity.
- Improve lipid levels.
- Lower blood pressure.
- Aid weight management.
- Improve blood glucose management in type 2 diabetes and lower risk of CVD.

Clinical Intervention:

- Encourage patients to find ways to fit activity into their daily routine. Examples include taking the stairs, parking further away, taking the stairs instead of elevator, or walking to another bus stop.
- Encourage patients to aim for at least 150 minutes/week of moderate aerobic exercise with no more than 2 consecutive days without exercise. If they are just starting out, encourage them to start with just 10 minutes, three times per day and build from there.
- Adults with type 2 diabetes should be encouraged to perform resistance training at lest twice a week in the absence of contraindications.
- Many patients are motivated by wearing a pedometer and tracking their steps. Encourage them to join a walking group and challenge each other to more and more steps.

Smoking
As well as other harmful effects, smoking increases abdominal fat accumulation and insulin resistance. All smokers should be encouraged to quit smoking. However, weight gain is common when quitting smoking and therefore dietary advice on avoiding weight gain should also be given (e.g. managing cravings and withdrawal symptoms by using short bouts of physical activity as a stress-relief activity, rather than eating snacks) [24].
Clinical Intervention [24]:

- Obtain documentation of history of tobacco use.
- Ask whether smoker is willing to quit.
- If no, initiate brief, motivational discussion regarding:

- The need to stop using tobacco
- Risks of continued use
- Encouragement to quit, as well as support when ready
- If yes, assess preference for and initiate either minimal, brief, or intensive cessation counseling.

Other behaviors to consider include [25]:

Stress and depression: There is evidence of a link between depression and both diabetes and cardiovascular disease.

Sleeping patterns: Both short (<6h) and long (>9h) sleep durations may be associated with a higher risk of developing type 2 diabetes. Sleep deprivation may impair the balance of hormones regulating food intake and energy balance. Long sleep durations may be a sign of sleep-disordered breathing or depression and should be treated appropriately. There is also a close association between obesity and obstructive sleep apnoea syndrome (OSA), the most common form of sleep disordered breathing.

PREVENTION

Simple lifestyle measures have been shown to be effective in preventing or delaying the onset of type 2 diabetes. To help prevent type 2 diabetes and its complications, people should [3].

- achieve and maintain healthy body weight;
- be physically active – at least 30 minutes of regular, moderate-intensity activity on most days. More activity is required for weight control;
- eat a healthy diet of between 3 and 5 servings of fruit and vegetables a day and reduce sugar and saturated fats intake;
- avoid tobacco use – smoking increases the risk of cardiovascular diseases.

Large, population-based studies in China, Finland and USA have recently demonstrated the feasibility of preventing, or delaying, the onset of diabetes in overweight subjects with mild glucose intolerance (IGT). The studies suggest that even moderate reduction in weight and only half an hour of walking each day reduced the incidence of diabetes by more than one half [2].

Diabetes is a serious and costly disease which is becoming increasingly common, especially in developing countries and disadvantaged minorities. However, there are ways of preventing it and/or controlling its progress. Public and professional awareness of the risk factors for, and symptoms of diabetes are an important step towards its prevention and control [2].

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3. WHY IS VENOUS THROMBOEMBOLISM PREVENTION SO DIFFUCULT TASK?

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Venous thromboembolism (VTE) is very important disease, as judged by very high incidence, as well as morbidity and mortality rates [1]. VTE annual incidence is huge: 108 per 100 000 person-years among whites [2]. VTE mortality is also very high: For almost one quarter of pulmonary thromboembolism (PTE) patients, the initial clinical presentation is sudden death [2]. Financial part of the problem is also quite respectable: cost per PTE hospitalization increased from $5,198-$6,928 in 2000 to $8,764 in 2010. Readmission for recurrent VTE was generally more costly than the initial index event admission [3].

Therefore, VTE prevention is of great medical and social importance. At the same time, prevention is evidently suboptimal: some patients with clear indication for thromboprophylaxis do not receive adequate dose of anticoagulant, less numerous do not get a prophylaxis at all. Aforementioned high incidence proves insufficient prevention.

Reasons of failure to prevent this life-threatening disease are numerous and they relate to primordiary, primary and secondary prevention.

Primordial prevention occurs outside the health arena and the doctor-patient relationship; it consists of actions to minimize future hazards to health by inhibition of the recognized risk factors (environmental, economic, social, behavioral, cultural). It relates VTE prevention itself in many ways, including anti-obesity programs, actions to prevent traffic accidents and violence, campaigns to promote healthy life-style, etc. Such programs are expected to be beneficial, indeed, due to prevention of dozens of diseases and fractures requiring hospitalization, as well as prolonged bed rest. Moreover, the atherosclerotic diseases have been proved to be preventable; as risk factors for atherosclerosis overlap significantly with risk factors for VTE, adequate preventive measures might also be fruitful for the ubiquitous VTE.

Primary prevention is very important one, and –at the same time- very difficult. One of the most important reason for this is the fact that VTE can affect every single person in the world – if unfavorable circumstances occur. For example, everyone may suffer trauma or infection with dehydration, hypoalbuminaemia and prolonged bed rest (particularly if ≥7 days) [2].

This, particularly if combined with advanced age, might be enough to provoke VTE. Nobody might be regarded as absolutely safe, even athletes. As an illustration, the very best American tennis player also suffered VTE. “Patients with PTE differ so much in many aspects: they may be aged from babies to the oldest, from Paget-Schroetter syndrome in otherwise healthy sportsmen to dying patients with sepsis, respiratory failure, and heart failure”[4].

Media campaign is needed to underline basic risks for VTE, such as combination of cigarete smoking and oral contraceptives (anticonceptives), which increases VTE risk severalfolds. In addition, risk factors for VTE are so numerous [1], that it becomes difficult to remember them and take them into account, particularly in the crowded emergency room in the middle of the night. Another trouble with thromboprophylaxis is the well-known fact that it is not naive in terms of complications, i.e. bleedings do occurr. Therefore, the calculation of risk-benefit ratio for future thrombosis and bleeding in an individual

patient with versus without thromboprophylaxis is not easy even for experts in the field. Furthermore, VTE prevention becomes even more complicated when we realize that most of the patients at significant VTE risk are actually in the hospital or left it a few weeks ago. Compared with residents in the community, hospitalized residents have a >130-fold higher VTE incidence [2].

Namely, hospitalized patients already have severe disease (requiring hospitalization), which makes operation and/or multiple medications necessary and this, in turn, increases hemorrhagic risk and compromises risk/benefit ratio. Thus, doctors can not administer thromboprophylaxis freely if bleeding risk is high, due to severe disease and multiple comorbidities, as it often is in hospitalized patients.

Secondary prevention can be difficult, too. First of all, in almost half of patients with pulmonary thromboembolism (PTE), residual thrombus in pulmonary arteries remain following the first PTE episode [5].

This thrombus may induct recurrent PTE. Patients with (vs without) residual venous thrombosis had a 6.5-fold to 24.9-fold increase in the risk of a recurrent VTE [6,7,8].

Furthermore, inadequate secondary thromboprophylaxis may result from failure to recognize that patient has a thrombophylia, and –therefore- requires prolonged, sometimes life-long anticoagulant therapy. Even if thrombophylia is recognized, preterm cease of anticoagulant may occur, due to unwanted effect of anticoagulants or if patients wish to stop it. On the other hand, there are numerous examples of inadequate secondary thromboprophylaxis due to direct mistake. Too often we have been eye-witnesses of poor thromboprophylaxis as a result of misconception that aspirin is almost as good in VTE prevention as anticoagulants. Problems leading to failure of secondary prevention arise sometimes from inadequate diagnostic procedures, with numerous factors that might affect insufficient imaging and interpretation, either at admission, or during follow-up. Such examples are present in computer tomography pulmonary angiography (CTPA) and Lung scintigraphy, the most frequently used techniques to visualize thrombus in pulmonary arteries. In a randomized trial comparing the V/Q scan and CTPA in large series, 35% patients had normal scan finding. Out of them, only 0.8% showed proximal deep venous thrombosis (DVT) on ultrasonography and none of the remaining 34.2% patients developed a thromboembolic event during the follow-up [9].

The results indicated that the normal perfusion scan is quite reliable when it comes to excluding PTE (Fig.1).

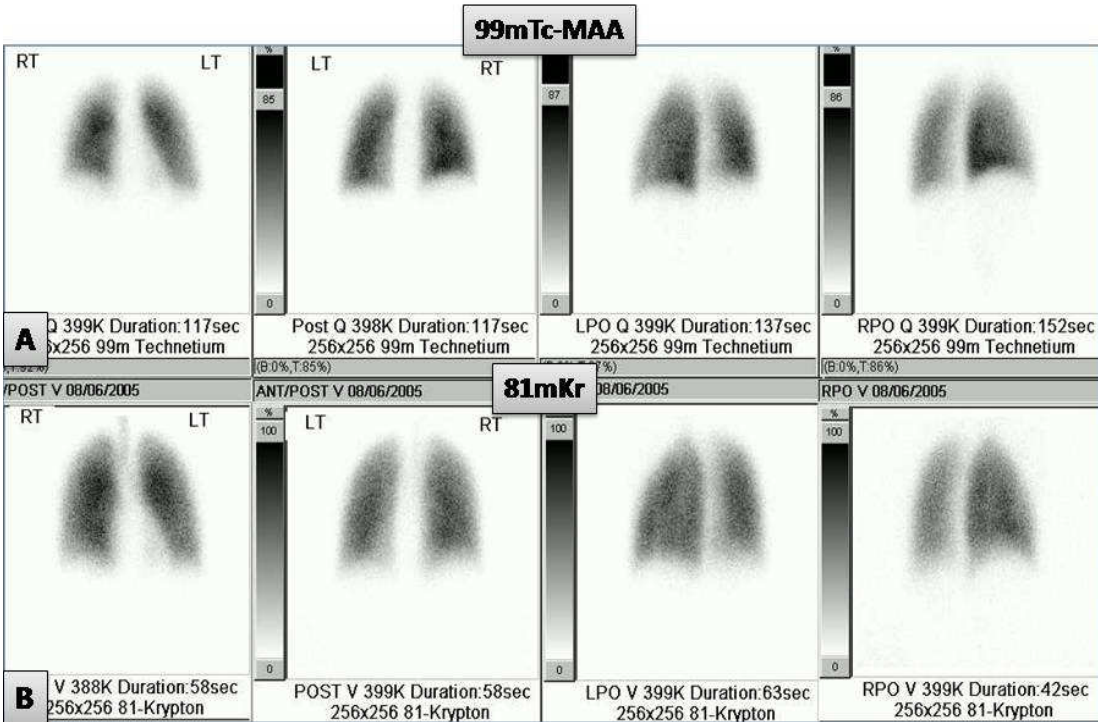

Figure 1. Normal V/Q scan- PTE excluded. A: Uniform distribution of 99mTc-MAA particles within the lung B: Uniform distribution of radioactive gas within the bronchopulmonary system.

Nondiagnostic V/Q scan in a patient with a low clinical probability of PTE is also an acceptable criterion for excluding PTE [10].

The value of at least one segmental mismatched perfusion defect is also highlighted and focally normal ventilation found in 350 patients which indicated a high-probability of PTE with the positive predictive value of 88% (95% CI, 84–91%) [9]. A high-probability V/Q perfusion scan establishes the diagnosis of PTE (Fig.2), but further tests could be considered in selected patients with a low clinical probability due to the lower positive predictive value of a high-probability V/Q scan result in such patients [10].

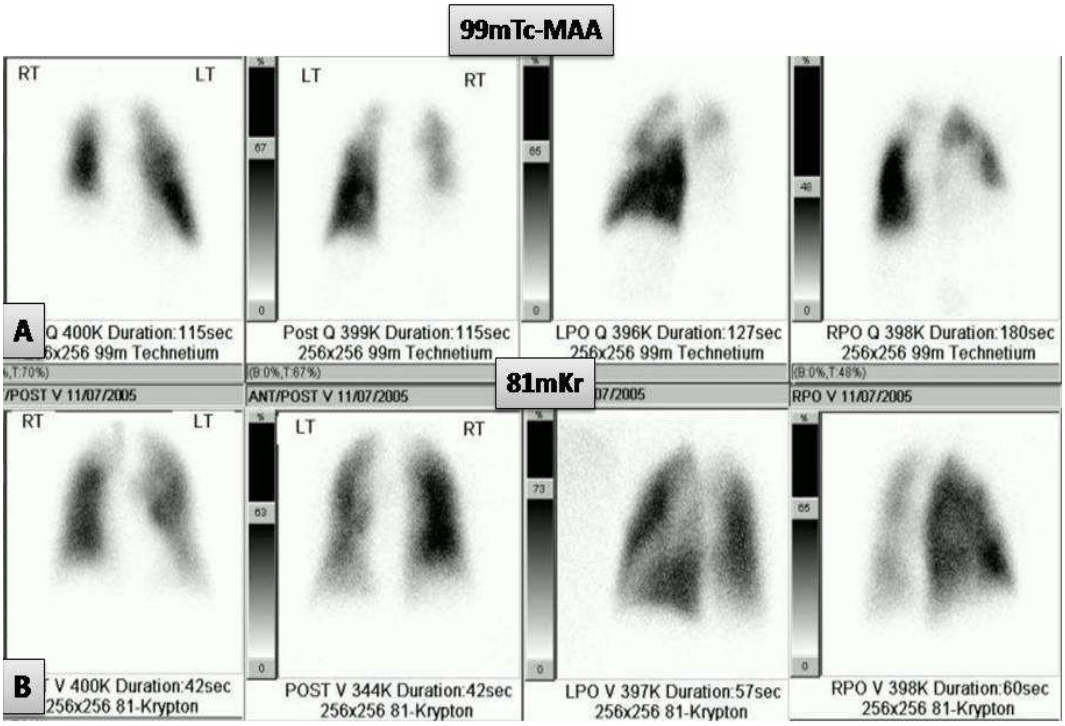

Figure 2. V/Q mismatch-PE confirmed. A: Multiple segmental perfusion defects on the right lung B: Normal distribution of radioactive gas in the regions with perfusion defects.

The advantages of CTPA, including high accuracy in diagnostic algorithm of PTE, additional information of the entire chest, and 24/7 availability, recommended this procedure as the primary imaging modality for suspected acute PTE. A recently recognized limitation of CT imaging of the chest brought about a note of caution concerning the estimated effective radiation dose after CTPA, which is somewhere between 3 and 5 mSv, or equivalent to 1 to 2 years of background radiation exposure [11].
The lifetime attributable risk of lung cancer from CTPA exposure varies between 38 and 118 cases per 100,000 patients, depending on age and sex. The risk of breast cancer, especially in young women, is also considerable - 503/100,000 excess cases [11].

All these observations enable V/Q scanning to remain an important diagnostic tool in the detection of PTE. Newer algorithms designed to detect or rule out PTE sequentially use clinical probability assessment, serum D-dimer levels, compression ultrasonography, and V/Q scanning in all patients. CTPA is performed only if the diagnosis is still uncertain after these steps [11].
Lung scintigraphy should be considered as the imaging test of choice in patients with a normal baseline chest radiograph, young women, patients with a contrast allergy or impaired renal function, and in patients in whom the test should be repeated during the follow-up, in order to monitor for resolution. In addition to diagnostic problems, the difficulties colleagues face in the field of thromboprophylaxis, are illustrated by an excellent example – in the field of gynecology and obstetrics. VTE, although relatively rare in pregnancy (the incidence of 0.05-0.2% of all pregnancies), represents one of the leading causes of maternal mortality [12-21].
Pregnancy itself carries 4 times higher risk for VTE in comparison with non-pregnant women of similar age; in puerperium the risk is even higher, up to 5-fold higher than during pregnancy [2,12,17,19].

The incidence of VTE could be significantly reduced if patients with enhanced risk were recognized in time and if they undergo accurate thromboprophylaxis, according to risk assessment (categories are: very high, high, intermediate and low) [17,22,23].

Ideally, all women should undergo risk factors evaluation before and (several times) during the pregnancy (because during the course of pregnancy some additional events and pregnancy-related complications may occur) [17,21,22,23].

Unfortunately, many pregnant women often live far away from the center with specialists capable of performing such a valid risk stratification, and a consequent, adequate VTE prevention. The goal of thromboprophylaxis is to provide protection from VTE with minimal side effects for the mother and no effects on the fetus – like teratogenity, fetal haemorrhage, CNS and other organs abnormalities, placental abruption and postpartum haemorrhage (PPH) [19,22].

This is the task that is very difficult to achieve and the choice of anticoagulants is highly limited. Warfarin, for example, with its proven teratogenity, is contraindicated in pregnancy and its use could be justified just in rare cases where the benefit over-weights the risk (women with mechanical heart valves) [17,20,22].

The anticoagulant of choice in pregnancy is heparin (does not cross the placenta, is not secreted in breast milk), preferably low molecular weight heparin, which produces more predictable anticoagulant response [17,22,23,24].

The development of heparin-induced thrombocytopenia (HIT) or HIT with thrombosis (HITT) or cutaneous allergic reactions to heparin might create a new problem, that is usually solved by switching to danaparoid or fondaparinux (although their safety in pregnancy still waits confirmation) [22].

Since the use of anticoagulants increases the risk of PPH, LMWH discontinuation is recommended 24h before the induction of labor or planned Cesarean section [18,22,25].

Unfortunately, labor might start unexpectedly, with no time to interrupt anticoagulant therapy; in such case more severe peripartal haemorrhage could be expected and the only antidote that we have, protamin sulphate, is not very efficient when LMWH has been used. If hemostasis is adequate, thromboprophylaxis could be continued 6-12h after vaginal and 12-24h after Cesarean delivery [22,25].

In an era of widely used regional anesthesia for both vaginal or operative delivery it should be kept in mind that thromboprophyalxis enhances the risk of development of an deleterious complication - spinal haemathoma, with subsequent paraplegia. It is recommended that epidural catheter should be inserted 12h after prophylactic and 24h after therapeutic dose of LMWH and removed 12h after the last dose [15,18,26,27]. If labor starts unexpectedly and the parturient has already received the anticoagulant, regional anesthesia should be avoided [28].

In general, together with improper infection treatment, inadequate VTE prevention has be considered the most important cause of avoidable death in hospital.

Some suggestions to improve VTE thromboprophylaxis:

1. As VTE may affect everyone, much better and broader education about risks, symptoms and signs is needed. Basic VTE knowledge should be considered as one of the elementary for health-related general education, due to very high incidence and mortality.
2. Moreover, patients with VTE can be found in each department, and, therefore, knowledge of VTE needs to be incorporated in teaching programs of various (sub)specializations.
3. Adherence to thromboprophylaxis guidelines should be controlled more regularly.
4. Teams for VTE, such as the one of Clinical Center Niš, can help to organize teaching colleagues and solving difficult patients in more efficient way.

Conclusion

VTE contemporary has high medical and social significance, due to huge incidence, prevalence, mortality and morbidity. Moreover, prevention of VTE is very difficult task because: VTE may suddenly affect every person, including sportsmen, if some of the frequent predisposing diseases /conditions occur; dozens of risk factors for VTE are known, making them difficult to reproduce and risk calculation troublesome; risks of thromboprophylaxis are real (especially bleeding), and reliable toll to calculate risk/benefit ratio is missing. This unmet need in prevention of highly lethal disease is a reason why VTE thromboprophylaxis should be among priorities in medicine for the years to come.

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4. NEW TRENDS IN FREQUENCIES AND DIAGNOSTICS OF LUNG CARCINOMA

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Abstract

Lung cancer is the most common and deadliest cancer in the world. Lung carcinoma can be divided into two broad categories: Small cell lung cancer and Non–small cell lung cancer, further divided into 3 major pathologic types: adenocarcinoma, squamous cell carcinoma, and large cell carcinoma. In the past several years the incidence of adenocarcinoma has increased greatly worldwide, and adenocarcinoma has replaced squamous cell carcinoma. In the period of 2013-2014, at the Institute of Pathology in Nis 410 cases of lung carcinoma were diagnosed. The most common major histologic type of lung carcinoma was adenocarcinoma (152 patients), seen in 37,07 % of the total amount of confirmed cases. Evaluation of pulmonary neoplasms requires determination of histopathologic type and differentiation, as well as assessment of probable site of origin. Detailed clinical evaluation and physical findings are very useful in the separation of primary and secondary pulmonary neoplasms. A large number of immunohistochemical markers have recently become available to facilitate accurate diagnosis and classification of pulmonary cancer (TTF-1, CK7/ CK20, p63, Chromogranin, synaptophysin and neural cell adhesion molecule (NCAM)-CD56).

Key words: Immunohistochemistry, lung, small cell carcinoma, adenocarcinoma, non-small cell carcinoma.

Introduction

Lung cancer is the leading cause of cancer-associated death worldwide (1). According to the GLOBOCAN series of the International Agency for Research on Cancer, Ferlay and colleagues (2) reviewed worldwide recent cancer data and estimated a total of 14.1 million new cancer cases and 8.2 million deaths in 2012. The most commonly diagnosed cancers were lung (1.82 million), breast (1.67 million), and colorectal (1.36 million). The most common causes of cancer death were lung cancer (1.6 million deaths), liver cancer (745,000 deaths), and stomach cancer (723,000 deaths). The most common cancer sites in Europe in 2012 were cancers of the female breast (464,000 cases), followed by colorectal (447,000), prostate (417,000) and lung (410,000). These four cancers represent half of the overall burden of cancer in Europe. The most common causes of death from cancer were cancers of the lung (353,000 deaths), colorectal (215,000), breast (131,000) and stomach (107,000)(3).

New trends in frequencies of lung carcinoma

Lung cancer arises from the cells of the respiratory epithelium and can be divided into two broad categories. Small cell lung cancer (SCLC) is a highly malignant tumor derived from cells exhibiting neuroendocrine characteristics and accounts for 15% of lung cancer cases. Non–small cell lung cancer (NSCLC), which accounts for the remaining 85% of cases, is further divided into 3 major pathologic types: adenocarcinoma, squamous cell carcinoma, and large cell carcinoma. Adenocarcinoma by itself accounts for 38.5% of all lung cancer cases, with squamous cell carcinoma accounting for 20% and large cell carcinoma accounting for 2.9%. In the past several years, the incidence of adenocarcinoma has increased greatly, and adenocarcinoma has replaced squamous cell carcinoma as the most prevalent type of NSCLC (4-6).

In the period of 2013-2014, 410 cases of lung carcinoma were diagnosed at the Institute of Pathology in Nis. The most common major histologic type of lung carcinoma was adenocarcinoma (152 patients), seen in

37,07 % of the total amount of confirmed cases. On the second place came squamous cell carcinoma, seen in 30,73 % of the cases (126 patients). Small cell carcinoma with 17,56 % (72 patients) occupied the third position, followed by large cell carcinoma with 1,95 % (8 patients). Other tumors (metastatic, undiferentieted and rare types of carcinoma) were seen in 12,68 %.

Tobacco use is the principal risk factor for lung cancer, and a large proportion of all pulmonary carcinomas are attributable to the effects of cigarette smoking. The International Agency for Research on Cancer (IARC) has identified at least 50 carcinogens in tobacco smoke. The agents that seem of particular concern in lung carcinoma are the tobacco-specific N-nitrosamines, formed by nitrosation of nicotine during tobacco processing and during smoking. Tobacco carcinogens, such as 4-(methylnitrosamino)-1(3-pyridyl)-1-butanone, which is known to induce adenocarcinoma of the lung in experimental animals, can bind to DNA and create DNA adducts (5). Repair processes may remove these DNA adducts and restore normal DNA, or cells with damaged DNA may undergo apoptosis. Failure of the normal DNA repair mechanisms to remove DNA adducts, however, can lead to permanent mutations. 4-(methylnitrosamino)-1(3-pyridyl)-1-butanone can mediate an array of signaling pathway activation that includes modulation of critical oncogenes and tumor suppressor genes that ultimately can result in uncontrolled cellular proliferation and tumorigenesis (7). Although all histologic types of lung cancer are associated with cigarette smoking, in smokers the association is stronger for SCLC and for squamous cell carcinoma. In contrast, adenocarcinoma of the lung is more common in never smokers compared with smokers. Adenocarcinoma, however, is becoming more common even among smokers.This finding may be attributable to the deeper inhalation of lowered tar-containing and nicotine containing cigarettes, leading to a more peripheral distribution of cigarette smoke in the lung. These peripheral bronchi lack protective epithelium and are exposed to carcinogens, including the tobacco-specific N-nitrosamines, which have been linked to the induction of adenocarcinoma. Although there has been no predominant causal factor that can fully explain lung cancer in never smokers, the risk factors considered important for never smokers include secondhand smoke; radon exposure; environmental exposures, such as indoor air pollution, asbestos, and arsenic; history of lung disease; and genetic factors (5).

New trends in diagnosis of lung carcinoma

Evaluation of pulmonary neoplasms requires determination of histopathologic type and differentiation, as well as assessment of probable site of origin. Based on clinicopathologic data, the lungs are involved by metastatic disease in one third to half of all malignant lesions. Detailed clinical evaluation and physical findings are very useful in the separation of primary and secondary pulmonary neoplasms. Although tumor morphology on hematoxylin and eosin (H&E) sections often times is sufficient to answer the question of whether the tumor is primary or metastatic, there is considerable overlap between pulmonary neoplasms and neoplasms originating from other anatomic sites. For instance, it can be difficult to differentiate primary lung adenocarcinoma from metastatic gastro-intestinal and pancreatic adenocarcinoma or from metastatic breast carcinoma. In the last decade, a broad spectrum of antibodies or immunohistochemical markers has been developed and used to resolve these differential diagnostic questions. Among the “specific” markers studied for pulmonary epithelium, thyroid transcription factor-1 (TTF-1) has received the most attention. In normal lung tissues, TTF-1 has been observed primarily in the nuclei of alveolar cells, particularly type II pneumocytes, non-ciliated bronchiolar cells (Clara cells), and basal cells. Among NSCLCs, up to 80% of adenocarcinomas have been reported to express TTF-1. It is helpful to combine Cytokeratin (CK7/ CK20) with other markers, particularly TTF-1, to differentiate between primary and metastatic carcinoma (8).

On the other hand, accurate distinction between SCLC and poorly differentiated NSCLC is a key decision point in clinical management. However, separating the two groups of tumors morphologically (cell and nuclear sizes, amount of cytoplasm, chromatin characteristics, and presence or absence of neuroendocrine

differentiation) can sometimes be challenging due to biopsy crush artifact, tumor necrosis, limited tumor representation, and overlapping morphologic features. Recent studies suggest the potential utility of several newer antibodies, including p63 and cytokeratin 5/6, to help differentiate SCLCs from NSCLCs. Squamous cell carcinomas showed diffuse moderate or strong staining for p63, and no or minimal staining for TTF-1. In contrast, most SCLCs manifested opposite immunoreactivities, showing diffuse moderate or strong staining for TTF-1 with no staining for p63. Chromogranin, synaptophysin and neural cell adhesion molecule (NCAM)-CD56 are the most reliable and widely used neuroendocrine markers in diagnosis SCLCs.

Over the last years the main oncogenic factors in the field of thoracic oncology have been mutations of EGFR, KRAS, and EML4-ALK translocation, which are most often reported in adenocarcinomas. EGFR mutations and ALK gene rearrangements are successfully targeted with specific tyrosine kinase inhibitors, which are superior to traditional chemotherapy (9,10).

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ORAL PRESENTATIONS

1. TEN YEARS OF PREVENTIVE MOBILE MAMMOGRAPHY IN THE CITY OF ZAGREB

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Background: Preventive Mobile Mammography Programin the City of Zagreb started in 2004 withmammography examination for women aged 45 to 65 free of charge. After implementation of the National program of early detection of breast cancer in Zagreb which began in October 2006, Program has been changing and accommodating regarding the needs of the population in the City of Zagreb. Program objectives are detecting breast cancer in its earliest stages, long-term reduction of breast cancer mortality rate and creating habits for women for the need of mammography examination.

Subject and Methods: Mobile Mammography Program is implemented in the mobile mammography unit through the suburbs/parts of the City of Zagreb. Besides that, mobile mammography unit performs examinations on other arranged locations to meet the needs of employed and older women. Examination needs to be arranged by telephone. Women are informed through the media about the location of mobile mammography unit. Mammography examinations are free of charge. Double checked mammography finding are send to women home address and are entered into a computer program.

Results: A total of 39 141 woman were examined during the period between 2004 and 2015. Mobile mammographic examination conducted in this Program was the first mammography examination for 16 390 woman, which is more than 41% of the total number of woman examined.

Conclusions: As all stated data indicate the need of conducting this type of intervention during the future period, this Program continues in 2015.

Key Words: Mobile mammography unit, City of Zagreb

2. PREVENTION AND EARLY DETECTION OF MELANOMA

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Melanoma skin is one of the most malignant tumors. The incidence of melanoma in Serbia and the world is increasing and most of the authors emphasize the fact that the number of patients with melanoma for every 10 years increased by 10 to 15%.

In developed countries, 80% of skin melanoma is detected at an early stage of the disease due to well-organized campaign for prevention and early detection. In Serbia, only one fifth of patients with this tumor is discovered at an early stage.

The aim of this paper is to highlight the importance of education, above all to medical professionals, but also the general population on prevention, then clinical signs for the early detection of melanoma.

The paper points to the importance of: sunburn, tanning, use solarium, use of protective factors against solar radiation, wearing protective equipment, self-examination, screening and regular controls by doctors in the prevention of melanoma.

Also, this work shows the ABCDE criteria for early detection melanoma and clinical picture of the most common form of melanoma.

Prevention and early detection of melanoma is of great importance for the fate of patients with pigmented lesions on the skin. Each with suspected change should be prevented surgically removed with PH verification.

Early detection of melanoma, when the disease is at an early stage of evolution, simple surgical intervention of the disease is curable.

3. MALIGNANT MESOTHELIOMA CLINICAL-PATHOLOGICAL ASPECT

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Abstract

Malignant mesothelioma is a rare tumor of mesothelial cells that occurs in the visceral or parietal pleura. The development of MM is strongly correlated with exposure to asbestos and erionite, as well as to simian virus 40. Patients present with chest pain, dyspnea, and recurrent pleural effusions. CT scans of the chest typically show marked pleural thickening with associated nodularity, and pleural effusions. The evaluation of clinical and radiological information is crucial in the diagnosis of mesothelioma. Therefore, active and open communication between pathologists and oncologists can never be overemphasized. According to the WHO classification, three histological subtypes are distinguished: epithelioid, sarcomatoid and biphasic malignant mesothelioma. For histopathologic diagnosis of malignant mesothelioma, besides the evaluation of morphological characteristics on standard hematoxylin and eosin method, the immunohistochemical analysis is necessary to confirm the mesothelilal differentiation. In the period of 2013-2014, 18 malignant mesotheliomas were diagnosed at the Institute of Pathology in Nis. Out of 18 patients, 16 were male and two were female. In all 18 cases malignant mesothelioma were of epitheloid histological type with variable glandular or tubular formation. Immunohistochemical analysis was applied in all cases.
Key words: malignant mesothelioma, immunohistochemistry, adenocarcinoma

Introduction

Malignant mesothelioma is a rare aggressive tumour arising from mesothelial cells of the pleural and peritoneal cavity including pericardium and tunica vaginalis testis. Approximately 90–95% of these tumors arise in the pleural cavity and 5–10% in the peritoneum. Infrequent sites of origin are the pericardium and tunica vaginalis in 1-2%. Mesothelioma is about three times more common in men than women, and most cases occur between the ages of 50 and 70 (1-3).
Malignant mesothelioma incidence has been increasing in recent years and it is not expected to fall off in the next two decades. The highest annual crude incidence rates for mesothelioma (about 30 cases per million) are observed in Australia, Belgium and Great Britain. (3). Asbestos exposure is the best known and evaluated risk factor with a long latency period between exposure and onset of malignant mesothelioma ranging from 15 to 60 years. Approximately 70 percent of cases of pleural mesothelioma are associated with documented asbestos exposure (2,4,5). Although worldwide consumption of asbestos has decreased, consumption is increasing in many developing countries. The limited data available suggest that exposures may also be high in developing countries. Mesothelioma is still increasing in most European countries and in Japan but has peaked in the United States and Sweden (6). Types of exposure to asbestos are: occupational, paraoccupational (domestic exposure, usually occurring in women), incidental (through hobbies or visits), and residential or environmental (living near a source of asbestos –such as an asbestos-producing factory). Most asbestos exposures are occupational. The industries with the highest risks of mesothelioma were construction and ship repair, the asbestos industry and manufacture of metal construction materials. Because most asbestos exposure in Europe is occupational, mesothelioma rates are higher in areas around industries utilizing asbestos. Mesothelioma accounts for more than 10% of deaths of workers in these industries. The risk of developing pleural mesothelioma after asbestos exposure is related to

the cubic power of time since first exposure, after allowing for a latency period of 10 years. It depends on the fiber type, as the risk is about three times higher for amphiboles, compared to chrysotile. Asbestos appears to act directly on the mitotic apparatus and indirectly via induction of reactive oxygen and nitrogen species and growth factors. Asbestos is both clastogenic and cytotoxic to mesothelial cells. The etiology of these alterations is unclear (3). Also, possible risk factors are radiation, recurrent pleuritis/peritonitis and simian virus 40 (SV 40). Other agents that have been reported as potential causative factors for mesothelioma include metals, rubber, scars, sugar cane, dietary factors, idiopathic, man-made mineral fibres, non-asbestos fibres/materials, zeolite minerals, genetic factors, chemicals, synthetic agents, polymers, hydrocarbons, hormones and smoking. Although these agents have been reported to be associated with pleural and peritoneal mesothelioma, they may also be involved in causation of mesothelioma of the tunica vaginalis. Asbestos has been reported to translocate in the body from the lung or gastrointestinal system to numerous organs, including the tunica vaginalis. It has been suggested that translocation occurs through the blood and lymphatic systems and/or immune system cells (i.e. macrophages) (7).

Clinical aspect

Patients present with chest pain, dyspnea, and recurrent pleural effusions. CT scans of the chest typically show marked pleural thickening with associated nodularity, and pleural effusions. There is direct lung invasion, with metastatic spread to hilar lymph nodes and distant organs including liver in advanced stages. Malignant mesothelioma shows either diffuse growth pattern or occurs as a localised tumour mass. Diffuse type represents an aggressive tumour with poor prognosis and is incurable in most cases (1,2).
As with any tumor, reliable diagnosis of mesothelioma depends on obtaining adequate, representative tissue samples. Closed punch biopsies generally produce only very small amounts of tissue, often consisting mainly of chest wall tissues. Pleural-based masses may be of sufficient thickness to allow image-guided, percutaneous, transthoracic needle core biopsies, but it is often necessary to resort to more invasive techniques, including video-assisted thoracoscopic or open biopsy. Occasionally, decortication of the lung may be justified on clinical grounds. Whatever technique is used, close correlation of the histological and radiological findings is essential: a confident radiological diagnosis of mesothelioma may sometimes help to determine the management pathway if the pathological appearances are equivocal (8).
Despite aggressive trimodality therapy, the prognosis of diffuse malignant pleural mesothelioma remains poor with a median survival of 9–12 months (9). Ki67 index proved to be, besides histology and treatment, an independent and reproducible prognostic factor in epithelioid but not in non-epithelioid subtype and suggests that induction chemotherapy decreases the proliferative capacity of malignant mesothelioma (10).

Pathological aspect

According to the WHO classification, three histological subtypes are distinguished: epithelioid, sarcomatoid and biphasic malignant mesothelioma. Rare variants are desmoplastic type, a subtype of sarcomatoid mesothelioma, undifferentiated type and deciduoid type (2,3).
Epithelioid mesothelioma consists of round, oval, or polygonal cells forming tubulo-papillary structures or growing in sheets, and accounts for 70% to 80% of all mesotheliomas. Sarcomatoid mesothelioma shows spindle cell features and resembles a sarcoma. Rarely, other elements such as cartilaginous or osseous foci may be present. Mixed type mesothelioma has both components intermixed, and accounts for approximately 20% of mesothelioma. Histological type is an important prognostic marker. Longest survival is seen in patients with epithelioid malignant mesothelioma. Sarcomatoid subtype has the worst prognosis (2).
Malignant mesothelioma shows macroscopical and microscopical similarities to benign lesions and other malignancies. Therefore, reactive mesothelial proliferations on the one hand and secondary tumours resembling mesothelial cells as well as benign or rare mesothelial tumours on the other hand have to be distinguished. Additional immunohistochemistry is essential in histopathological assessment using a marker

panel of antibodies but it should be interpreted with due regard to the clinical setting and radiological features, and with a knowledge of the wide morphological variations seen in mesothelioma (5).
The commonest histopathological diagnostic problem in a pleural biopsy is the distinction between mesothelioma and pulmonary carcinoma. The major differential diagnostic consideration for epithelioid mesothelioma is pleural involvement by metastatic adenocarcinoma. The distinction is especially difficult on small biopsies. There may be considerable morphological overlap. Many antibodies utilized in mesothelioma are selected for their ability to differentiate between mesothelial and epithelial cells, and can be divided into two broad groups: carcinoma markers and mesothelioma markers (3). Typical panel should include at least two epithelial (e.g.,TTF-1, MOC-31, Leu-M1, and CEA) and two mesothelial (calretinin, CK5/6, HBME-1, Wilms tumor product-1, and D2-40) markers. Positivity of two mesothelial markers with negative adenocarcinoma markers is suggestive of mesothelioma (2).
In the period of 2013-2014, at the Institute of Pathology in Nis 18 malignant mesotheliomas were diagnosed. Out of 18 patients, 16 were male and two were female. In all 18 cases malignant mesothelioma were of epitheloid histological type with variable glandular or tubular formation. Immunohistochemical analysis was applied in all cases. Positive immunoreactivity for CK5/6, calretinin and EMA were detected in 100%, for vimewntin and D2-40 were found in 10/10 samples, WT-1 in 16/18 samples, while the reactivity to TTF-1 and CEA were negative in 100% of the samples.

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4. HISTOPATHOLOGIC ASPECTS OF ASPERGILLOSIS

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Abstract

Introduction: The incidence of fungal infections is still increasing with presence of resistant fungi. The diagnosis of this condition is usually delayed due to its non-specific presentation.
Aim: The aim of this study was to analyze possibility of detection fungal infections on histopathologic samples.
Material and Methods: At Institute of Pathology, Medical Faculty, University of Niš, bioptic material from January 2013 to December 2014, was analyzed. The standard histological sections were used and presence of fungal infections was analysed after AB-PAS and silver-methenamin stain.
Results: Three patients with fungal infection were found. Two od them had noninvazive bronchopulmonary aspergillosis and one with aspergillosis of paranasal sinuses. Septate hyphae branching at about 45 degrees, characteristic of aspergillus species, were found. The width of hyphae was 4 µm.
Conclusion: Histopathologic examination allow diagnosis of aspergillosis by showing the presence of *Aspergillus* hyphae with AB-PAS and silver-methenamin stain.
Key words: aspergillosis, alcian blue PAS, silver-methenamin,.

Introduction

Human aspergillosis can be classically divided as invasive, saprophytic or allergic. *Aspergillus fumigatus* is the species most commonly responsible for invasive aspergillosis, followed by *Aspergillus flavus*, *Aspergillus niger* and *Aspergillus terreus* (1). These fungi can use the lower respiratory tract, sinuses or skin as entry portals to cause invasive infections. Inhalation of airborne aspergillus spores results in colonization of the respiratory mucosal surfaces. The progression from colonization to tissue invasion and the type of disease that patients develop depend mainly on their immune status and on local defense mechanisms.
The non-specific clinical presentation often leads to late diagnosis and poor prognosis. The most common form of invasive aspergillosis in immunocompromised patients is invasive pulmonary aspergillosis, involving the respiratory tract in 90% of cases. This disease occurs almost exclusively in immunosuppressed and especially myelosuppressed patients, although there have been rare patients without any grossly apparent immune defect.
Infection confined only to the tracheobronchial tree is known as invasive aspergillus tracheobronchitis (IATB), and it generally carries an ominous prognosis. The diagnosis of this condition is usually delayed due to its non-specific presentation (2).

Aim

The aim of this study was to analyze possibility of detection of aspergillosis on histopathologic samples.

Material and Methods

At Institute of Pathology, Medical Faculty, University of Niš, bioptic material from January 2013 to December 2014, was analyzed. The standard histological sections were used and presence of fungal infections was analysed after AB-PAS and silver-methenamin stain.
The width of hyphae was estimated on digital pictures using software ImageJ, at objective x40 of BX-50 microscope (Olympus, Tokyo, Japan).

Results

In our cases the diagnosis was obtained by endoscopic biopsy and surgical resection. Patients developed cough and malaise several months before diagnosis. Macroscopically, mucosa appeared to be necrotic and friable. Histopathologic examination allow diagnosis by showing the presence of *Aspergillus* hyphae in special stains (Fig. 1). The width of hyphae was 4 µm.

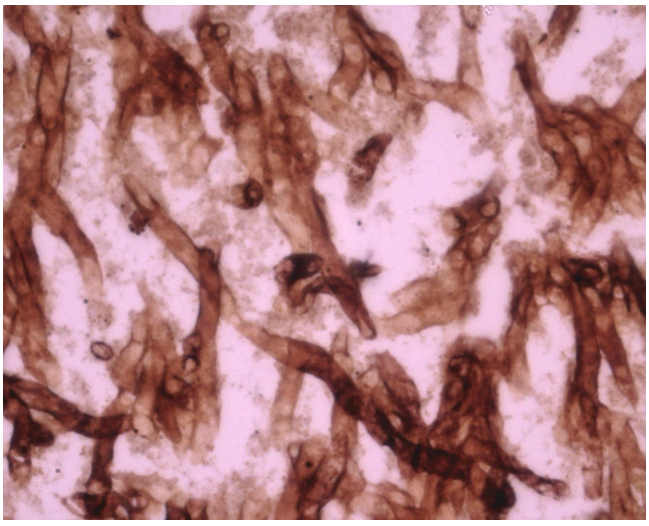

Figure 1. Septate hyphae branching at about 45 degrees, characteristic of aspergillus species. Silver-methenamine, obj. x40.

Discussion

Aspergillus causes disease of wide clinical diversity. Invasive aspergillus tracheobronchitis (IATB) is a rare manifestation defined as localized invasion of the bronchial wall by aspergillus. Three morphological variants of IATB have been described: obstructive tracheobronchitis, ulcerative tracheobronchitis and pseudomembranous necrotizing bronchial aspergillosis (PNBA).
The obstructive form is characterized by massive intraluminal growth of aspergillus species associated with thick mucus plugs that generally produce atelectasis.
Ulcerative lesions like the one we found in our patient penetrate through the tracheo-bronchial wall, and can create bronchoesophageal or bronchoarterial fistulas that may produce fatal hemorrhage. PNBA is characterized by extensive formation of whitish pseudomembranes composed of hyphae, fibrin and necrotic debris. Rather than three distinct entities, these morphologic variants may just represent different stages in the development of IATB (3).
Allergic bronchopulmonary aspergillosis affects patients with asthma and bronchiectasis. Aspergilloma is mass of fungal mycelia that grow in preexisting lung or other cavities. It is composed of hyphae of Aspergillus, fibrin, mucus, inflammatory cells, blood, and epithelial cell components. Many cavitary lung diseases such as tuberculosis, sarcoidosis, cavitary tumor, pulmonary fibrosis, bronchiectasis, and histoplasmosis are complicated by aspergilloma. There are a few reports on endobronchial aspergilloma without underlying pulmonary lesion. This is understood that *Aspergillus* species colonizing respiratory tract

can secrete digestive enzymes into the surrounding lung parenchyme and create space for growth of fungus ball. The foreign body might act as a nidus of *Aspergillus* growth (4).
Fungi are much more common in chronic rhinosinusitis than previously appreciated, as commensal sinonasal fungi are ubiquitous. Allergic fungal sinusitis (AFS) is thought to be an allergic reaction initiated by these ubiquitous fungal allergens, and perpetuated and further amplified by eosinophils (5).
The non-specific clinical presentation often leads to late diagnosis and poor prognosis. Among the most reliable methods for the diagnosis of invasive aspergillosis is the histopathological examination of stained tissue sections. The detection of non-pigmented, septate hyphae which show repeated dichotomous branching is characteristic of *Aspergillus* infection. However, other less common hyaline moulds, such as *Fusarium* species and *Scedosporium apiospermum,* can appear similar (6).

Conclusion

Histopathologic examination allow diagnosis of aspergillosis by showing the presence of *Aspergillus* hyphae with AB-PAS and silver-methenamin stain.

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POSTER PRESENTATIONS

1. FACTORS ASSOCIATED WITH DEPRESSION IN PATIENTS WITH ISHEMIC HEART DISEASE

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Background: The aim of the survey was to assess the prevalence ofthe depression in patients with ishemic heart disease, and the identification of risk factors associated with thedepression.
Materials and methods: A cross-sectional survey was carried out among the patients with ishemic heart disease at General Hospital in BijeloPolje. Sample of 72 patients participated in the survey. Patient Health Questionnaire 9 (PHQ – 9) is used for the assessment of the presence and the intesity of the depression. The data related to social and demographic characteristic, body – mass index, physical activity, comorbidity, duration of the disease and complications were obtained by questionnaire made for the survey.
Results: Depression was associated with the age (p = 0,014), dwelling place (p = 0,014), education (p = 0,023) and presence of comorbidity (p = 0,023). Independent variables according to logistic regression analysis were presence of comorbidity (OR= 5,74; 95% CI=1,45– 22,80), education(OR= 3,62; 95% CI= 0,99–13,25), dwelling place (OR= 4,17; 95% CI=1,22–14,26) and physical activity (OR= 0,34; 95% CI=0,13–0,93).
Conclusion: In our survey we found that risk factors for depressive disorders among patients with ishemic heart disease are presence of comorbidity, education, dwelling place and physical inactivity. This suggests that the control of the above-mentioned risk factors, the risk for the occurrence of depression could be decreased.
Keywords: Depression, Ishemic Heart Disease, Patient Health Questionnaire 9

2. INCIDENCE OF MALIGNANT DISEASES IN RASKI DISTRICT DURING THE PERIOD 2003-2012

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Objectives: Malignant diseases are, similarly to the situation in other parts of Serbia and Europe, among the most important causes of morbidity and mortality in Raski district. After years of collecting data that are complete and of a good quality, we were in position to review trends. It enables designing and concentrating preventive programs and improves decision making on health system organization and performance.
Materials and methods: We have analyzed incidences of malignant diseases in a ten years period (2003-2012) in this article. Standardized incidence rates have been calculated for males and females and compared in all municipalities (we used statistical tests and graphic methods). Finally, comparison was made with standardized rates for the district as whole and central Serbia.
Results: For all malignant diseases (apart of non-melanoma skin cancers) incidence in Raski district is similar to the rate in central Serbia in both males and females. However, there are statistically significant differences when incidences were compared between individual municipalities, with Kraljevo, Raska and Vrnjacka Banja having significantly higher rates than Novi Pazar and Tutin. Standardized incidence in females shows decreasing trend in all territories, while in men rates increase in Kraljevo and Novi Pazar, decrease in Raska and Tutin and are stable in Vrnjacka Banja.
Conclusion: Further and more specific surveys are needed to evaluate causes of observed differences and trends.
Key words: malignant diseases, incidence, Raski district

3. IMPORTANCE OF REHABILITATION IN SECONDARY PREVENTION OF CORONARY ARTERY DISEASE IN PATIENTS AFTER CORONARY ARTERY BYPASS GRAFTING

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Introduction: Patients after coronary artery bypass grafting (CABG) are at high risk of cardiovascular and arrhythmic events. To minimize the risk of further complications and mortality, require the regulation of risk factors of coronary artery disease.
Objective:The aim of this study was to investigate the effect of rehabilitation on the risk factors of coronary artery disease in patients with CABG.
Methods: The study involved 124 patients with CABG, average age 55.7 years.Patients were randomly divided into the rehabilitation group (RG 103 patients) and non-rehabilitation group (NRG-21 patients). Patients were of similar age and baseline stress test duration. In all subjects clinical examination, exercise stress test and laboratory analysis were performed and after that RG patients were included in rehabilitation program, consisting of physical training, dieting and balneo climatic factors. RG patients were instructed to follow a physicaltraining program using the bicycle ergometer (10 min, 2 times a day) and walking. The patients continued to take the same medicaments in same doses. After the rehabilitation treatment, which lasted 21 days, the patients were re-made laboratory analysis and exercise test.After the rehabilitation treatment, which lasted 21 days, the patients were re-made laboratory analysis and exercise stress test.
Results: In the RG patients, after three weeks, we have found significant reduction of systolic blood pressure from 137.7 ± 13.2 to 129.4 ± 10.8 mmHg ($p < 0.001$); diastolic blood pressure from 86.2 ± 6.9 to 82.2 ± 5.8 mmHg ($p < 0.001$); total cholesterol from 5.9 ± 1.4 to 5.5 ± 1.2 mmol/L ($p < 0.05$) and heart rate from 76.2 ± 7.4 to 67.5 ± 6.3 beat/min ($p < 0.001$). On the second exercise stress test RG patients achieved significanty larger time and significanty larger workload ($p < 0.001$ for both parameters). In contrast, the non-rehabilitation group showed no significant changes.
Conclusion: The study showed that in patients with CABG rehabilitation treatment led to a significant reduction in blood pressure, cholesterol and heart rate and significantly increased physical working capacity. Rehabilitation plays an important role in secondary prevention of coronary artery disease in patients with CABG.
Keywords: coronary artery bypass grafting, rehabilitation, physical training, coronary artery disease,

4. MYOSARCOMA UTERI

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Introduction: Myosarcoma is malignant neoplasm of the muscular and connective tissue of the uterus. The tumour is rare but very malignant with a high mortality rate. It occurs with women over 50 years of age.
Aim: Irregular and prolonged bleeding should be as soon as possible diagnosed by means of ultrasound and exploratory curettage in order to discover the real malignant changes in the uterus.
Method: To detect the tumour by ultrasound and exploratory curettage; to remove the tumour surgically.
Outcomes: An ultrasound scan and explorative curettage revealed HP myosarcoma uteri - a fibroid of 7 cm. A surgery with the same HP findings was performed, followed by a chemotherapy and radiation treatment. After 5 months, due to relapse, another surgery was done.

SOCIAL MEDICINE SESSION

Topic: CURRENT APPROACH TO HEALTH CARE SYSTEM STRENGTHENING

INVITED LECTURES

1. **HUMAN RESOURCES INTHE HEALTH CARE SYSTEM**

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2. STRENGTHENINGPRIMARY HEALTH CARE SYSTEM

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Introduction: In Serbia, reduction of birth rate on one hand and extended life expectancy of people on the other, is leading to the demographic aging of the population. Increasing prevalence of people with multiple chronic diseases, together with the development of medical technology leads to increased health needs and health demands of the population and to an increase in health care prices. As early as the second half of the twentieth century world experts recognized the upcoming issue and sought solutions that would enable countries to cope with new health problems. The strategy "Health for all by the year 2000", which was later developed into a "health strategy for the XXI century", alongside "The Declaration of Alma-Ata" on primary health care, are some of the documents that have been enacted in order to find solutions for the improvement of human health. Consequently all countries of the world have begun to reform their health systems with emphasis on the reorientation of primary health care (PHC) as defined in the Declaration. Since then the PHC in Europe is faced with high expectations, so that it can help the health system to be better prepared to respond to changing health needs and to provide more comprehensive and complex forms of health care and increase the efficiency of the entire health system. The European Commission and the Expert Panel on Effective Ways of Investing in Health (EXPH) launched from 20 March until 19 May 2014 a public consultation on the preliminary opinion on the 'Definition of a frame of reference in relation to primary care with a special emphasis on financing systems and referral systems'. EXPH analyzed functioning of the quality and scope of health care in 31 European countries and came to a series of conclusions for the improvement and strengthening of the health system. One of the conclusions is that a strong PHC is positively correlated to the achievement of equality in health care access and to the improvement of health in the population, but at the same time it was pointed out that it is essential to constantly evolve primary health care in order to be able to respond to the challenges that arise in a society that is constantly changing (1). Strengthening of primary health care is the basis of all health systems reforms in Europe. However, the problems the countries face are often diametrically different, but all reforms tend to go in the same direction to make health care a more adequate, and in line with modern standards, available to the whole population (2). It is, therefore, necessary to develop an instrument that will evaluate the results of the reforms and the functioning of the PHC. The instrument needed to be capable of measuring the performance of PHC in the same way in all countries so that the results are comparable and capable of obtaining information that would allow politicians to make decisions on the basis of real documented data (evidence based). System reform is often not well understood: first and foremost is understanding that reform does not mean changing everything existing, but direction and the changes that will give better results. Reform of the health system is a process that strengthens the system and it is a process of identification and implementation of changes in policies and practices in the health system of the country, so that the country can respond better to changes in population health and challenges facing the health system. Strengthening the health system also includes any initiative and strategy that strengthens one or more functions of the health system and that leads to better health by improving the accessibility, coverage, quality and efficiency of the system (3). In this article some of the obtained results of WHO instrument (Primary Care Evaluation Tool) PCET analysis of PHC in Serbia will be shown, at the same time emphasizing some weaknesses of the system with recommendations for the improvement of primary health care in Serbia (4).

Primary health care today

In the spirit of PHC definition given in Alma Ata in 1978 WHO stresses out the need for countries to organize such care which enables the provision of health care where people live and work, with equal treatments of the same needs, tailored to health care users and not only in relation to diseases (person-oriented health care). Each country has its own definition of PHC but a well-developed system should have

the following characteristics: PHC is a part of the health system where the user enters the system for all his or hers health needs and problems, where health-care is directed towards the person and not the disease, and it links the users, if need be, with other levels of referral. Primary health care must have a holistic approach in the treatment of health which means that the attention should not be paid only to the medical health needs but also to other causes of disease. It makes PHC to face the person and not the disease. This gives a significant role to primary health care in achieving the “Health 2020” and the Millennium Development Goals of the United Nations. In our health system basic or major institutions for the implementation of PHC are community health centers and they are organized in a way that enables them to achieve their given role of “the health system gatekeepers”. The chosen doctor should enable users to connect with other professionals horizontally within the PHC system and vertically with secondary and tertiary health care services when they are needed. At the same time PHC services provide home visits to users and they need to link the health system users with other structures in society.

Primary Care Evaluation Tool Instrument (PCET) for assessment of PHC includes four functions of the health system:

•governance/stewardship

•funding

•resource generation

•service delivery with its four characteristics: availability, continuity, coordination and comprehensiveness of services.

The instrument consists of three separate questionnaires:

1. The questionnaire for experts regarding national policies and organization of PHC

2. Questionnaire for physicians in PHC

3. The questionnaire for users / patients

Some of the conclusions of the analysis of the organization and operation of PHC with comments

Governance and funding

The connection with local governments as well as inter-sectoral cooperation were the characteristics of PHC of Serbia in the former Yugoslavia even before the Declaration of Alma Ata and it served as an international model. Because of many unfortunate events and lasting economic crisis, the position and role of health care, and particularly PHC, has changed considerably. A series of policy papers were published, we would like to underline the following: " Vision of the health care system in Serbia ", " Strategy and action plan for health system reform in Serbia by the year 2015" and a strategic document " Better health for all in the third millennium." All documents and strategies adopted since 2002 are working towards common solutions that can improve and enhance our health care system. The reforms are aimed at improving primary health care, at the chosen doctor and at decentralization. That is what stands in published policy papers but in reality it is enough to say that in the Ministry of Health a department that deals specifically PHC does not exist. Decentralization was implemented by transferring of ownership rights to local governments without a transfer of funds, that is, with a very centralized financing system. Salaries of PHC employees are 100% funded from the Health Insurance Fund, a capitation formula was introduced but has not shown improvement of work in primary health care because it was ill-conceived. A very important conclusion of the analysis was that 59% of users stated that they need to make additional payments for medication and even every ninth user claimed they did not go to their chosen doctor because of financial reasons. Thus conceived PHC doesn't provide actually access and use of health care.

Centralized funding and centralized personnel policy makes it impossible for health care institutions to have the autonomy and flexibility they need. Today instead of solid models a flexible model adapted to local conditions and needs in delivery of health services is desirable. The way of managing and financing which exists in Serbia brings into question the possibility of effective and efficient "do the right things in the right way" management. An additional financing problem has arisen as a reduction of mandatory health insurance contributions for health care, levied on salaries, which was reduced from 12.3% to 10.3% for a total reduction in the Health Insurance Fund of 37 billion annually.

Resource generation

Generating resources includes providing personnel and tangible assets to provide adequate health care. Serbia has decided to have a chosen doctor in PHC and it can be a general practitioner or a specialist in occupational medicine, a pediatrician as children's chosen doctor, and, in addition, every woman should have a chosen gynecologist. This kind of personnel commitment in PHC is sometimes a problem for comparison with other countries where there is generally a family doctor or a general practitioner (GP). However it is more important to analyze what is at the primary level of services available and provided to users. On every 1000 people in the population the number of general practitioners was 0.7; dentists 0.3; nurses 5.5. This is the average for Serbia, but there are significant territorial differences. A bigger problem than the lack of staff is the average age of employed physicians, 49 years for general practitioners and 51 years for pediatricians, which, with the existing government policy of not hiring, and restrictive specialization policies, can lead to major problems in the immediate future. Improving the quality of work is measured through a series of questions related to formal and informal education, usage of "good clinic practice" guides, consultations and teamwork. "Good clinic practice" guides are used by 61% of general practitioners and 41% of pediatrician. Computers are available for slightly more than half of physicians but are rarely used for information dissemination about the patient and consultations with other professionals. Teamwork is poorly developed and even the doctor – nurse team has just a small percentage of a formal meetings, while the majority of contacts and consultations with other professionals are reduced to solving individual cases. Equipment in PHC is insufficient and there is no supportive equipment in relation to the requirements that are placed in front of the professionals who work there. Of the 30 listed devices that are supposed to exist on this level there is an average of 14 medical appliances in existence. To doctors in primary health care laboratory and radiology diagnostics are available, and the average waiting time for laboratory analyzes results for general practitioners was 3.9 days and 1.5 days for pediatricians, while the waiting time for X-ray diagnostics was even longer: 7.5 days for general practitioners and 1.7 days for pediatricians.

Service delivery

Four main characteristics are evaluated in service delivery: availability, coordination, continuity and comprehensiveness. Availability of facilities and personnel have already been discussed and that part is not compromising service delivery. Economic barriers are due to the existing additional payments (participation). Consultation with other professionals are insufficient even in individual cases (arrangements and consideration of approaches in treatment of individual patients). When it comes to comprehensiveness in addition to indicators showing constant improvement of skills of professionals working in primary health care, which are mentioned above, users it is essential that the chosen physician is the first contact person for the comprehensive treatment and management of health care users. Analysis of 18 health problems when the chosen physician should have been the first contact on a scale from 1 to 4 was on average 2.1 among general practitioners and 1.7 among pediatricians. This means that more than half of the users "skips" the chosen physician as the first point of contact. Also, in half of the cases the average score of following in the treatment of certain conditions on a scale from 1 to 4 was 3 among general practitioners and 2.2 for pediatricians. From this we can conclude that the central role of primary health care physicians in providing health care for users has not fully come to life and leaves a lot of room for

improvement. The introduction of e-cards (electronic patient records) and information technology on all levels, first horizontally and then vertically, into the health system would significantly improve the coordination and comprehensive approach to health care.

Recommendations

Recommendations on what should be done to improve primary health care are given instead of a conclusion. They are not final, nor are they ranked by relevance.

1. Health insurance card

2. Restoration of the mandatory health insurance contributions to previous levels

3. Improving management (flexibility and autonomy)

4. Providing supplemental health insurance with pre-defined service packages from mandatory insurance

5. Defining the skills and knowledge for all professional profiles while ensuring adequate education

7. Providing necessary equipment for PHC

8. Improving coordination with other referral levels

9. Improving teamwork

10. Introducing of E-cards (electronic patient record), IT, and connectivity within the health system level and between referral levels.....

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3. **STRENGTHENING THE SYSTEM OF HOSPITAL HEALTH CARE**

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In Serbia, the patient is first treated in the Primary Health Care identified with a health card. If the attending physician is unable to take care of a patient, he gives the patient a referral for a hospital treatment.

The hospital represent a health institution performing healthcare activity on secondary level. The hospital is established for the territory of one or more municipalities. The hospital provides health-care activities such as: diagnostics, treatment and rehabilitation or in the case of complexity and severity of the disease need special conditions in terms of personnel, equipment, lodging and medication. The hospital is obliged to cooperate with the Primary Health Center and provides its expert assistance in the implementation of primary health care. Inpatient and specialist-consultative activity of a hospitals form a single functional and organizational unit.

The hospital should have organized the following services:

1. reception and treatment of emergency conditions;

2. the performance of specialist-consultative and stationary health activities in internal medicine, general surgery, pediatrics and obstetrics and gynecology;

3. laboratory, X-ray and other diagnostic services in accordance with their activity;

4. anesthesiology resuscitation;

5. rehabilitation;

6. pharmaceutical services through the hospital pharmacy.

Special hospitals are another hospitals in the health care system in Serbia. Specialized hospital provides health care protection to patients of certain age groups, or patients with certain diseases. It performs specialized consulting and in-patient health care for the field it was founded for, laboratory and other diagnostic services, such as pharmaceutical services through the hospital pharmacy. Special hospital must provide: medical transport, supply of blood and blood products and service for pathological anatomy.

The Institute represents hospital at the secondary and tertiary level. The Institute is a health institution that performs highly specialized consulting and in-patient health care, or only highly specialized consulting health activity in one or more branches of medicine or dentistry. The Institute may be established only at the seat of the University that is composed of faculty of health professions. The Institute carries out educational and research activities.

The Clinical Center provides the highest level of health care in Serbia. It perform highly specialized consulting and inpatient health care from several branches of medicine. Also, performs educational and teaching activities as well as scientific research activities. Clinical Centre in its composition must have at least 3 clinics and institutes, and only can be established in a city where the faculty of medicine is situated. The Clinic is a health institution that performs highly specialized consulting and in-patient health care from a particular branch of medicine or dentistry.

Clinical-medical Centre performs highly specialized consulting and in-patient health care from multiple branches of medicine. It has at least a general hospital and clinic. Clinical Centre is owned by the state in which the seat there is a general hospital performs for the territory for which it was created and the appropriate activities general hospitals. Can be established only at the seat of the University that is composed of faculty of health professions.

Results

7.8% of the population in Serbia were treated in the hospital in 2013, while the average number of days spent in hospitals per capita was 16 days. In Nisava district, 5.7% of the population were hospitalized, and the average length of treatment was 12 days. Beds fund had been utilized for 99.31%.

The incidence of hospitalization was higher among the elderly compared to younger: among the population aged 15 to 54 years was 4.9% of hospitalized patients, among the population aged 55 and over, this percentage was significantly higher and amounted to 12.9%.

The hospitalization rate in Serbia in 2013. was 77.7, and in Nisava district 57.4. The number of hospitalized patients per 1000 people was the biggest among the population aged between 75 and 84 years 163.5 per 1000, among the population of South and Eastern Serbia 89.6 and among the population living in rural settlements 86.8 per 1000.

In comparison with 2006. slightly increased percentage of the population was hospitalized for a period of one year in 2013. (7.8% vs 6.5%) as well as the hospitalization rate, as well as the number of hospitalized patients per 1.000 people (77.7 versus 64.5).

The daily hospital received 10.4% of the population of Serbia, while the average number of outpatient visits per capita amounted 5. The percentage of the population treated in a hospital outpatient settings was higher among females (11.9% versus 8.7% for men), among persons with lowest educational profile (12.3% versus 9.5% of high and 9.6% of secondary education profiles), as well as among residents of Vojvodina (13.4% versus 10.5% of the population of Sumadija and Western Serbia, 8.8% of the population of Southern and Eastern Serbia and 8.2% of the population of Belgrade).

Hospitals in Serbia today and how to proceed:

The population of Serbia is getting older, but hospitals do not follow this reality. There are no adequate changes in the structure of available beds in hospitals organization. A lot number of risk factors for the population's health exsits and it is also insufficiently monitored. We have daily informations about health situations but they go as informative rather than health education. It is also inadequate co-operation between hospitals, rehabilitation centers and institutes for public health.

The organization of hospitals is very difficult to change, because it is burdened by tradition and local habits. The big problem is to reorganize the work of health services in accordance with the new structure of patients morbidity. Reform of hospital health care is not the business of the profession, but a political process. The little or insufficient impact of social medicine in the reform process is evident.

A certain number of hospital departments has excessive capacity. When it is desired to reduce the capacity big problems occur because of the employees resistance. It is very difficult to change jobs or departments for the health workers in Serbia.

We live in a time of economic recession and longterm reform. That is the reason why most hospital buildings today are dilapidated and inadequately maintained. The equipment is outdated or insufficient. Employees are finding various ways to provide health care in poor conditions. In the last few years increased interest of the Ministry of Health is evident to overcome these problems.

Big difficulties are evident in supplying medications and medical supplies. The system of public procurement and tendering has further complicated the procurement and represents a major problem in their daily work. There is the idea of centralized supply in the State level, but it has not been realized yet.

The quality of health services is not standardized, and there is no adequate levels in the health care system. There is no organized health care delivery across levels, so everyone would be doing everything. And this is usually determined by the management and the training employees. So today, in practice, every hospital has to provide many services, and the question is whether it is right. It is necessary to regulate types of services in all health institutions.

Low productivity and efficiency in hospitals is evident today. Employees are financially not motivated. The system of hospital financing is outdated. In recent years, hospitals are funded under the new resources available without taking into account the specific features and real needs. That is why the planning of health care in hospitals pushed to the absurd, without respecting the views of experts in social medicine, but new professionals of the health insurance fund. Our health care system will remain without a sufficient number of certain medical specialists. The quality of health care will be disabled too.

In daily practice hospital capacities used to provide primary health care. Hospital settings today provides a number of interventions (diagnostic and therapeutic) that are not necessary. Unfortunately doctor in many cases is still not in a position to provide health care but only writes the instructions and sends the patient further into the system.

The concentration of personnel in major cities is omnipresent. High quality staff go abroad or to the better paid hospitals. Inadequate treatment of private practice and the ability to physicians working in governmental and private practice is a huge problem.

The future of the hospital can be better if we do the following:

Requires qualitative influence of the Ministry of Health, local governments and markets; the planning and delivery of hospital health care, financing, development of hospital health care and raising the quality of coordination along with experts in social medicine.

It is necessary to make significant efforts to strengthen the primary health care system with paying greater attention to the promotion and prevention, and improving the health of the nation. A better cooperation in the health care system at all levels should be achieved.

It is necessary to decentralize and regionalize hospitals, to create conditions for equality in the development and distribution of funds. Modern hospitals must be more oriented towards the patient and his requirements. Introduction of new technologies and constant staff education should be continuous process in all hospitals.

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4. HEALTH LITERACY: THE IMPORTANCE AND ROLE IN HEALTH CARE SYSTEM

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Abstract

The sphere of health has expanded far beyond the confines of the healthcare system itself. Today, in almost every aspect of our lives, we are faced with questions and decisions about our health. As society changes, so do the necessary skills needed to function. Citizens have to continually assimilate new information and discard outdated information in order to guide their health decisions.

The current understanding of health literacy (HL) is mainly based on a conceptual model provided by members of European Health Literacy Project defines HL as being" linked to literacy and encompasses people's knowledge, motivation and competencies to access, understand, appraise, and apply health information in order to make judgments and take decisions in everyday life concerning healthcare, disease prevention and health promotion to maintain or improve quality of life during the life course."

Being health literate enables an individual to make informed decisions, to influence events and to exert greater control over their own lives i.e. health literacy is crucial to personal empowerment. Health literacy may affect the health and ability of the healthcare system to provide effective, high-quality health care.

The primary responsibility for improving health literacy lies with public health professionals and the healthcare and public health systems. Policies and programs are needed to respond to the extent and impact of low literacy.

The sphere of health has expanded far beyond the confines of the healthcare system itself. Today, in almost every aspect of our lives, we are faced with questions and decisions about our health. As society changes, so do the necessary skills needed to function. Citizens have to continually assimilate new information and discard outdated information in order to guide their health decisions (Kickbusch et al., 2006).

From its beginnings, appearing in the literature in 1974, (Simonds 1974) health literacy (HL) has become an important area of international research (Baker 2006). Health literacy as discrete form of literacy is becoming increasingly important for social, economic and health development. Early definitions tended to focus on a patient's ability to read and understand health care information and their compliance with medical instructions. Later, definitions broadened to include the ability to assess health information, make informed choices, personal empowerment and the importance of context (Kickbusch et al., 2006). An important step in examining literacy and health outcomes is to clarify what literacy means and how it has been measured. In its most common usage, literacy refers to an individual's ability to read and write (OED 2003). It is also sometimes used to describe a person's facility with or knowledge about a particular topic. For example, we often see phrases such as "science literacy," or "computer literacy." These terms generally refer to a person's ability to function in a particular context that requires some background knowledge. In this same way, "health literacy" has been defined as a constellation of skills that constitute the ability to perform basic reading and numerical tasks that are required to function in the health care environment (AMA 1999). Patients with adequate health literacy can read, understand, and act on health care information (Nutbeam 2000). Some authors have used an expanded definition of health literacy that includes a working knowledge of disease processes, self-efficacy, and motivation for political action regarding health issues.

The current understanding of HL is mainly based on a conceptual model provided by members of European Health Literacy Project defines HL as being" *linked to literacy and encompasses people's knowledge,*

motivation and competencies to access, understand, appraise, and apply health information in order to make judgments and take decisions in everyday life concerning healthcare, disease prevention and health promotion to maintain or improve quality of life during the life course."

HL is presented both as a function of an individual's capabilities, allowing the person to acquire and apply new health information e.g. primary prevention strategies, developing healthy lifestyles which lead to better health outcomes. It also relates to the demands placed upon the individual by the systems in all societal settings (Nutbeam 2000). So, it works in both directions; HL is a determinant of the individual's health and independently HL is determined by other factors.

Being health literate enables an individual to make informed decisions, to influence events and to exert greater control over their own lives i.e. health literacy is crucial to personal empowerment (Nutbeam 2000). Studies have shown a direct link between individual health literacy and health outcomes. It has been shown that limited HL may have a direct, negative effect on health with (i) worse self-management skills, (ii) lower use of preventative services, (iii) higher hospitalisation rates, (iv) worse self-rated health, (v) increased mental health disorders (vi) poorer medication adherence in chronic disease (e.g. diabetes and cardiovascular disease) and (vii) higher rates of mortality (Berkman et al 2004, 2011). This amounts to increased healthcare costs for the individual and thus, the supporting economy. A recent systematic review concluded that on the health system level, the additional costs of limited HL range from 3 to 5% of the total health care cost per year whilst on the patient level, the additional expenditures per year per person with limited HL compared to persons with adequate HL ranged from US $143 to US $7,798 (Eichler et al 2009), a trend which is likely to continue.

Health literacy may affect the health and ability of the healthcare system to provide effective, high-quality health care. Studies have shown that people with low health literacy understand health information less well, receive less preventive health care, incur higher medical costs, and use inefficient mixes of services and expensive health services more frequently (Howard et al., 2005; Berkman et al., 2011).

Populations at risk include: elderly (age 65+), minority population, immigrant population, low income, people with chronic health conditions, lack of educational opportunity, learning disabilities (Barry 2003, Sudore 2006).

The primary responsibility for improving health literacy lies with public health professionals and the healthcare and public health systems. Policies and programs are needed to respond to the extent and impact of low literacy. All levels of government need to be involved in developing and supporting such health literacy policies and programs. There are required to reduce the numerous and interconnected individual and system barriers to health literacy. It is important to ensure that health information and services can be understood and used. Also, attention should be directed to the population groups that appear most likely to have low levels of health literacy. Where there are adequate levels of health literacy, that is where the population has sufficient knowledge and skills and where members of a community have the confidence to guide their own health, people are able to stay healthy, recover from illness and live with disease or disability.

None of this will happen without the recognition that health literacy is a serious concern which needs to be addressed.

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ORAL PRESENTATIONS

1. PREVENTION IN UROLOGY: ALL THAT GLITTERS IS NOT GOLD

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Abstract: Prostate cancer represents the third most frequent diagnosed tumor of all tumors (skin tumors excluded) in overall population in Europe and industrialized countries, being the first diagnosed tumor in elderly male in Europe and USA, with total estimated costs in Europe of 8.43 billion Euros. Although this is certainly due to the increasing age of the population, the discovery of prostate specific antigen (PSA) has had an important role in increasing the incidence of prostate cancer, increasing in the same time the number of patients treated, causing urinary incontinence and erectile dysfunction as a main post-operative discomforts, without decreasing the specific prostate cancer mortality. Talking about prevention we can define two types of screening: population or mass screening which is represented by systematic examination of asymptomatic men at risk and opportunistic screening which consists of individual case findings initiated by the person being screened and/or his physician. The co-primary end points in screening are reduction of mortality and a maintained quality of life as expressed by quality of life adjusted by gain in life years. Applied to the prostate cancer, it has been seen that PSA screening is associated with an increased diagnosis and with more localized disease and less advanced prostate cancer but no prostatespecific survival benefit nor overall survival benefit have been observed. There is no level 1 evidence that PSA screening reduces mortality due to prostate cancer and the impact on the patient's overall quality of life is still unclear. Given that the urinary incontinence rate goes between 89 and 100 % and erectile dysfunction rate between 26 and 81 % at 12 month after radical prostatectomy, we could deduce that uncontrolled PSA screening could have a very negative impact on patient's quality of life. In conclusion, there is no indication for population based systematic PSA screening, because it could lead to overdiagnosis and overtreatment. PSA screening should be offered to well informed men with good performance status and good life expectancy or at men at risk of prostate

2. HEALTH PSYCHOLOGY IN THE ACADEMICAL EDUCATION OF HEALTH WORKERS

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The aim of this paper is to analyze some aspects of applications of health psychology and behavioral medicine in medical practice, all in context of continual medical education.

The paper suggests:

1. Continual interdisciplinary education of health professionals.
2. Using of professional resources in that domain.
3. Developing a inside motivation of health workers for selfeducation.
4. Including the psychological knowledge and skills in regular education.
5. Making conditions for include health psychology in education.

Conclusion: it is necessary to include knowledge and skills from health psychology in regular education of health workers.

Key words: health psychology, behavioral medicine, education.

3. STRENGTHENING HEALTH-CARE SYSTEM FOR THE ELDERLY – THE NEEDS AND DIRECTIONS OF FURTHER DEVELOPMENT

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Introduction: The studies of demographic change trends, both at the national and global levels, indicate regularities concerning more accelerating population ageing. It is estimated that the proportion of population over 65 years of age will reach 27.5% in general population in 2025 in developed countries, while in Southern Europe countries the proportion of the elderly is expected to be between 9.1% and17.7%. Apart from mortality rate for general population (among the highest in Europe), its causes and dominance are of particular importance. The highest rate of mortality causes in our conditions are cardiovascular diseases with 53.9% out of the total number of deaths in 2011 and malignant diseases (20.4%) that are also among the highest European rates. In the same year the risk factor scale of acute coronary syndrome revealed smoking (32.1%), dyslipidemia (50.7%) and hypertension (73.4%) as the most common and immediate causes of death. Having in mind a continuous ageing trend at the global levels, the World Health Organization issued a strategy for 21st century primarily including the measures to enable longer, healthier lives and to maintain better quality of life for vulnerable elderly population. National strategy on ageing was adopted in the Republic of Serbia in 2006. Healthcare policy is directed to healthy ageing and maintaining the balance between responsibilities of healthcare providers and personal ones, creating a more friendly environment and solidarity between generations. **The aim of our paper** is to point out the key problems in healthcare system for the elderly as the framework for better promotion and protection of older people's health in future. **Methods:** we used data on current problems noted in certain segments of healthcare system the older people are referred to, requiring more intensive activities to realize the strategy for healthy ageing. **Current practice:** Declared role of healthcare system in active ageing is directed towards: health promotion, disease prevention, and equality in receiving qualitative primary healthcare and long-term care as well, particularly taking care of health indicators in older people in the community. Adequate health promotion programmes have been made on the basis of population ageing trend accompanied by medical, social and economic repercussions. Many of these programmes have been conducted in Serbia, being more or less successful, depending on numerous factors. Up-to-date experiences on elderly people health promotion indicate the following requirements: implementation of legal and administrative decisions including economic mechanisms, promotion of the centers for health promotion development, development and social policy and financing of care for chronic diseases programme. In the developed countries where the concept of health promotion had been adopted earlier, it has been conducted more successfully and also includes endeavours to initiate self-help volunteering. System of education of the elderly, University of the Third Age, in Serbia after 2000 does not provide sufficient statistical data and the programmes are usually not based on elderly people health care demands. Further development strategies would also include adoption of geriatric standards, primarily concerning preventable health problems (incontinence, immobility, walking instability, dementia and mental disorders); more education programmes for primary health care providers concerning implementation of specialization and sub-specialization of doctors in health promotion, geriatrics, nutrition, communicology courses and family medicine, as well as focusing on professional education of health care nursing personnel on geriatric nursing and finally, empowering the system of terminal illness care and home health care that has been neglected in our country in recent years due to financial problems in the health care system. **Conclusion:** It is necessary to strengthen the healthcare system for the elderly concerning demographic, health-care and social perspective due to expected further ageing of our society.

Key words: elderly persons, health-care protection

4. PREVENTION OF PSYCHOSOCIAL RISK

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The aim of the work: Prevention of psychosocial hazards or risk factors in health activities that can produce bad psychological and physical effects.

Methodology of the work: The study of the research was done in which were used two standardized questionnaires: 1. COPSOQ - Questionnaire for the assessment of psychosocial factors in the work environment (National Centre for the Working Environment (NRCWE), Copenhagen, Denmark) 2. WAI - Questionnaire for the assessment of the Work Ability Index (Work Ability Index, National Institutes of Health and Safety at Work, Finland). Total has tested 815 health workers, of which 605 (74.2%) women and 210 (25.8%) men. Of 680 tested health workers Clinical Center in Nis was 503 (74.0%) women and 177 (26.0%) men, from 44 respondents from Special hospital for nonspecific pulmonary diseases in Sokobanja was 35 (79.5%) were female and 9 (20.5 %) were male, while 91 respondents from General Hospital in Aleksinac was 67 (73.6%) women and 24 (26.4%) men.

Results: Among the characteristics of jobs and scores COPSOQ questionnaire by domain, multivariate regression analysis as the most important factors affecting the value of the IRS allocated an internship at the current workplace and scores: quantitative requirements, the meaning of work, obligations in the workplace, trust in leadership, health and samoprocenjenog stress. With each increase of service for 1 year was associated significantly lowering the value of the IRS and the 0,020 (0.010 to 0.030; p <0.001). Every increase in the value of the scores of the following domains 1 was associated with a significant increase in the value of the IRS include: the meaning of work to 0.144 (0.076 to 0.212; p <0.001), the obligation in the workplace to 0.067 (0.002 to 0.132; p = 0.044), trust the leadership of 0.063 (0.003 to 0.122; p = 0.041) and samoprocenjenog health to 0.458 (0.355 to 0.651; p <0.001). Every increase in the value of the scores of the following domains 1 was associated with a significant decline in the value of the IRS include: quantitative requirements for 0.150 (0.080 to 0.219; p <0.001), and the stress of 0.081 (0.018 to 0.144; p = 0.012). The regression model containing the above 7 factors and constant regression explained 24.6% of the variability values IRS (coefficient of determination R2 = 0.246). When in a regression model as independent variables included all factors in multivariate analyzes by blocks were significant, the final model as the most analyzed factors associated with the values of the IRS confirms the age of 50 to 59 years, age 60 years and over, taking painkillers every day, passive or entertainment activity less than 2 hours a week, scores of quantitative demands, obligations at work, meaning work, samoprocenjenog health and stress, and enjoy daily activities. Age from 50 to 59 years is associated with a decline in the value of the IRS of 0.441 (0.224 to 0.657; p <0.001), and age 60 years or more to 0.841 (0.408 to 1.274; p <0.001). Daily use of painkillers is associated with impairment of IRS 0.843 (0.372 to 1.315; p <0.001) and physical activity, which consists of passive or entertainment activities that are less than 2 hours per week to 0.285 (0.073 to 0.496; p = 0.009). Enjoying the daily activities associated with the increase in the value of the IRS to 0.152 (0.046 to 0.257; p = 0.005). Every increase in the value of the scores of the following domains 1 was associated with a significant increase in the value of the IRS include: the meaning of work to 0.144 (0.078 to 0.210; p <0.001), the obligation in the workplace to 0.068 (0.005 to 0.130; p = 0.035) and samoprocenjenog Health of 0.369 (0.266 to 0.473; p <0.001). Every increase in the value of the scores of the following domains 1 was associated with a significant decline in the value of the IRS include: quantitative requirements 0.125 (0.056 to 0.194; p <0.001), and the stress of 0.082 (0.020 to 0.145; p = 0.010). The regression model that includes these factors and constant regression explained 27.6% of the variability values IRS (R2 = 0.276).

Conclusion: The practical significance of the study lies in the intervening organizational character, based on the research results, and the motivation of the team managers of the health system in their institutions to continuously monitor psychosocial factors in the workplace and work on their improvement, which would contribute to a better quality of life and increase in labor index the ability of employees. Management of health care institutions, within a defined strategy in the fight against stress, should provide professional, expert team for drafting the Prevention and continuous monitoring of the implementation of interventions regarding the adoption of healthy lifestyles, involvement in anti-stress management programs and mastering strategies for coping with stress, to improve health, professional skills, readiness and preservation of working capacity. Extremely successful business people differ from those of the average for its exceptional level of empathy, self-discipline and initiative, all of which is part of emotional intelligence. Raising the level of emotional intelligence is a guarantee of preventing psychosocial risks.

Key words: psycho-social risk factors, health stuff

5. THE PREVALENCEOF AUTISM SPECTRUM DISORDERS

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Autistic spectrum disorders (ASD) are developmentally abnormal conditions expressed through specific cognitive, emotional, and neurobehavioral abnormalities of the child. The most striking thing is the changed social communication of the child, along with restricted and repetitive patterns of behavior. Early detection of disorders provides early intervention in the period when the therapeutic window is wide open. The understanding of autism spectrum disorders, but also the prevalence of the disorder, have changed radically in the last four decades. Once a rare disease with prevalence of 4 to 10,000, now reaching epidemic with prevalence that ranges over 1%. According to the Center for Disease Control (CDC) prevalence in the US is 1:68. ASD is about 5 times more common among boys (1:42) compared to girls (1: 189). ASD is present among all racial, ethnic and socioeconomic groups. The increase in prevalence is not explicable solely in better recognition of the disorder by experts and parents, as well as broader diagnostic criteria. Comorbidity in 70% of cases, in 41% of cases 3 or more comorbid conditions. ASD does not affect only the individual, but their influence is transmitted to their families, the local community. It is believed that in every country around 5% of people are affected by autism (directly or indirectly), which is why the ASD can be seen as blazing, and not enough recognized public health problem.

Keywords: autism spectrum disorders, prevalence

6. CAUSE OF PSYCHOSOCIAL STRESS CONDITIONS OF STAFF IN BUSINESS SYSTEM

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Stress as an equivalent to external and internal causes of the diseases of modern man. Social cohesion and psychological factors in the process of stressful basis formation. New etiological factors in the XXI century in structuring the stress reaction. Corrections of lifestyles (through a multidisciplinary approach) as well as the possibility of correcting or reducing the stressful reactions and abreaction. Recognizing one's own resistance and structure through four basic processes of a stressful situation therapeutic procedures: Rumination, Restitution, Restoration, Relaxation. Deeper recognition of unconscious motives positioning for stress and detecting the so-called basic conflict, and its relaxation as an essential etiological basis of stress. Differentiation of psychological (emotional, spiritual and cognitive), social and biological stressors as synergistic substrate of stressful reactions. Socio-psychological reconstruction and resolution of intra- and inter-personal conflict and dispersion as a precondition of repositioning individuals in a stressful situation. Phenomena dekonceptualizacije and repositioning as new possibilities in understanding and treatment of stress. Psycho-analytical approach in harmony with social and integrative methodology restructuring of stress. Appreciation of the archetypal and cultural aspects in individual and group therapy of stress. Education management and recognition of stress positions in the system.

7. TYPHUS, EPIDEMIC TYPHUS, EUROPEAN TYPHUS, TYPHUS EKANTHEMATICUS, FIRST WORLD WAR IN SERBIA

Stanko Marjanovic[1], Natasa Tasic[1,2], Zoran Milosevic[1,2], A. Visnjic[1,2], O. Radulovic[1,2], A. Rankovic[3], D. Nikolic[1]

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The beginning of a wonderful story related to medical ethics, humanity can not be the dock itself off if not quoted Hippocrates before about 2,500 years (cited is processed women Geneva version), where in the first sentence we have Dr.Elizabeth Nes Mekbin Ros. Dr Elizabeth Ness Mekbin Ros ro | one on February 14, 1878 in London. In January 1915, she worked the first in Nis military hospital, more precisely in Pasteur Institute. At the end of January he went to Kragujevac in the first reserve military hospital and suffering. The British Medical mision is strongly resented because of personal involvement, sacrifice to, but she thought othing significance, remained I hope one word and that, even today warning and is often, "Well, somebody has to do it."Elizabeth Ross, died on February 14, 1915, at its 37 birthday, and a message left by people and doctors at the first item of the Hippocratic Oath.

The First World War was a small kingdom of Serbia brought great destruction and human casualties. But that's not all, the Austro-Hungarian Empire had the first defeat in the war with Serbia, and had a large number of prisoners of war who are walking free in Serbia. This army was virtually created an epidemic of typhus, about half a million people have died of the disease 1914 and throughout 1915.

Rikecije
(Rickettsia)
Morphology: small bacteria (genome size of about ¼ of the genome of E. coli) is difficult to paint the Gram require the Special staining, pleomorphic (coccobacilli, diplobacili, individual sticks).

The cultural characteristics: a strictly intracellular bacteria (typically in the cytoplasm and / or nucleus, never in the vacuoles), so-called. "Energy" parasites. Reproduction only possible in vivo (laboratory animals, chicken embryo, tissue culture). Biochemical characteristics: moderate biochemical activity.

The antigenic material: containing group specific antigen protein nature (cell wall) and type-specific antigens (cytoplasm). Some have thermostable polysaccharide antigen common antigen Proteus OX19 (Weil-Felix agglutination reaction).

Variations: genetic variations (spontaneous, e.g., E-Madrid R. Prowazekova strain which is used for active immunization because of low virulence for man and experimental animals).

Resistance: osetljovost on external temperetauru and resistance to drying (in the feces of lice can survive for several months at an adequate temperature and humidity.

Classification: Based on the phylogenetic similarity and clinical characteristics of diseases caused classified as:

rikecije group typhus (Rickettsia Prowazekova, Rickettsia typhi) rikecije groups of colorful fever.

POSTER PRESENTATIONS

1. TOTAL QUALITY MANAGEMENT IN PUBLIC HEALTH INSTITUTES IN SERBIA

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Total quality management involves managing that leads to the achievement of defined objectives and the satisfaction of clients and patients. The most important goal of TQM is to satisfy the demands of its clients, the patients. Quality objectives must be measurable, consistent with the policy of quality, timed with the activities to be carried out, and with the necessary resources to achieve them.
In TQM, all employees should take part in improving work processes, improving service delivery, product as well as cultural institutions in which they work. The basic elements of TQM are: Orientation towards the client, Patient continuously improving, Involvement of the employees, Leadership Orientation towards process of work, Education and training of staff, Establishing good relations with interested parties, Decision based on the facts and systematic strategy, Communication.
Monitoring the quality of health care in the Republic of Serbia has a legal framework: Law on Health Care (Official Gazette of RS, No.107/05), Ordinance on indicators of health care quality (Official Gazette of RS, 49/2010) Strategy for continued improvement of the quality of health care and patient safety (Official Gazette of RS, No.15/2009), Conclusion on the adoption of an action plan to implement the strategy for continuous improvement of health care quality and patient safety for the period 2010-2015. (Official Gazette of RS No. 40/2010), Methodological guidelines for the process of health care institutions reporting on indicators of health care quality (Ministry of Health of the Republic of Serbia Institute of Public Health of the Republic of Serbia).
Total quality management in the departments / institutes for public health in the Republic of Serbia include: Reliance on defined indicators of quality of work (Ordinance on indicators of health care quality (Official Gazette of RS, 49/2010) Monitoring of the defined criteria of quality of work and definition of goals and required activities (Development of the Integrated plan for improvement based on the Integrated report on the execution of the plan), Laboratory Accreditation, Certification Institute /Institute of Human Resource, Renewing and procurement of necessary equipment, Improving technical conditions.

2. PREVALENCE OF HOSPITAL ASSOCIATED INFECTIONS IN SERBIA III NATIONAL STUDIE IN DISTRICTS BOR AND ZAJEČAR

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Hospital infection (HI) is an infection that occurs among patients and hospital staff in a hospital or any other public health institute. It represents one of the chief causes of the increasing number of diseased and passed-away patients in hospitals.
In november 2010, the third national study of the hospital infection survey was conducted in Serbia. The study was carried out in six general hospitals in the district of Bor and Zajecar and it was finished within a month.
The aims of the study were recognition of the hospital infection survey and encouragement of the hospital staff to continuously monitor, prevent and keep under control the occurence of the hospital infections through the work of the hospital infection board.
Among six general hospitals in Zajecar, Bor, Knjazevac, Negotin, Kladovo and Majdanpek, which have taken part in the study in the district of Bor and Zajecar, four of them have detected none of the hospital infections. (Knjazevac, Negotin, Kladovo and Majdanpek).
At the time of the study we found 117 patients in a general hospital in Bor (helth care center Bor). Six of the hospital infections were detected among six patients. The rate of the hospital infection (HI) survey was 5,13 %, as well as the rate of the patint survey with the hospital infections.
As far as general hospital in Zajecar (helth care center Zajecar) is concerned, we found 114 patients in hospital. Seven patients were infected by eight hospital infections. One patient suffered from two hospital infections. The rate of tge hospital infection survey was 7,02 %, and the rate of the patient survey suffering from the hospital infections was 6,14 %.
This study, together with the two previous ones, has shown that the hospital infection (HI) occurs in our hospitals, although it is not reported- by doctors-
HI has not been detected in four hospitals during our study, which implies that the study of the survey cannot be applied to the smaller hospitals (under 100 patients) which was also confirmed by the results of the two previous studies carried out in 1999. and 2005.
More precise details about the number and type of the HI in general hospitals of smaller capacity would be achived by the constant inspection of the HI occurence rate, as well as by the period in a high-risk departments. What is recommended to the medical boards is to put this suggestion into practice.

Key words: hospital infections, prevalence study of hospital infections

3. FIVE YEAR ANALYSIS OF PRESCHOOL CHILDREN MORBIDITY IN NIŠAVA DISTRICT

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Introduction: The health status of preschool children represents a great importance for the whole society. A special attention sould be paid to this population group not only because of increased sensitivity to the effects of the various factors that may endanger their health, but also due to the fact that poor health and unhealthy lifestyles in childhood may result in poor health throughout their lives.
Aim: The aim of our study was to analyze the five-year morbidity of preschool children in Nišava district.
Data collection: Data of the children morbidity, aged 0 to 6 years, in the Primary Health Care Centers were collected from the annual statistical reports. We analized a period from 2009. to 2013.
Results: Number of established diseases, conditions and injuries in the health care services of preschool children in the five-year period moved from 150574 diseases in 2009. to 131060 in 2013. The highest rate was recorded in 2009. (6166.5 per 1000 children), with a reduction in rates by 2012, and wit a rebounding in 2013 (5781.2 / 1000), although without reaching the level in 2009. Respiratory diseases ware the mosto common, accounted for about 70% of the total morbidity. The following is a group of diseases of the digestive system, which makes up about 4.0% of morbidity (the rate was about 250 ‰ in this period). Diseases of the skin and subcutaneous tissue were in the third place with a share of 3-4% in the five-year period (morbidity rate - about 200.0 ‰). Diseases of the ear and mastoid process, representing approximately 3.0% of all recorded diagnosis in this service (the rate - about 150.0 ‰) were in the fifth place. Four of the five most common diagnoses belong to the group of respiratory diseases. The first four are: acute inflammation of the throat and tonsils, acute upper respiratory tract infections, acute inflammation of the larynx and trachea, and laryngitis and tracheitis. The fifth most frequent disease were diseases of the skin and subcutaneous tissue. The top five diagnoses in the service for Health Protection of preschool children accounted for about 70.0% of the total mortality in the five-year period.
Conclusion: In the five-year morbidity of preschool children in Nisava district 6 diagnoses were registered annually per child. Respiratory diseases were dominated.

Key words: preschool children, morbidity, Nisava district

4. MEASURING QUALITY OF LIFE IN PATIENTS AFTER BREAST CANCER SURGERY

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Introduction: Breast cancer is a global public health problem, not only due to the fact that the disease has epidemic proportions, but also because its consequences affect virtually all segments of society and significantly shape the lives of patients. Patients with cancer are surviving, among other things, changes of appearance - such as the loss or disfigurement of breasts, skin discoloration and hair loss - which results in psychological stress that affects their quality of life.
Goal: The aim of this study was to find out something more about the quality of life of women who underwent breast cancer surgery - both in terms of the type of operation and the type of post-operative therapy.
Materials and subjects: In the period from September 2014 to May 2015, 102 women were interviewed after breast cancer surgery, which were hospitalized at the Oncology Clinic CC Nis after the decision of the medical consilium.
Results: Choice of treatment depends on the acquired habits and wishes of patients, risk factors (smoking, diabetes, obesity, previous surgery, radiation, history of thrombosis, cardiovascular disease, etc.), possible radiotherapy after mastectomy, as well as the skills of the surgeon. If you do not perform radiotherapy, immediate implant reconstruction is recommended. On the other hand, if radiation therapy after mastectomy is indicated, secondary autologous breast reconstruction is the procedure of choice.
The quality of life of patients and satisfaction with aesthetic outcome after reconstruction involving breast implants is much better when it meets the following criteria:
• The patient was included in the decision to perform the reconstruction of (N = 102; 68.7% compared to 37.7%, p = 0.020).
• Single-sided implant (n = 102; 59.8% compared to 52.2%; p <0,001).
• No radiation therapy after breast reconstruction (72% versus 57.2%; p <0.01).
Conclusions: The aim of every reconstruction should be for reconstructed breasts to look natural and symmetric and to be soft and sensitive.
Future studies should address the quality of life of patients and long-term aesthetic results after breast reconstruction.

5. THE USE OF HOSPITAL BEDS IN THE SURGICAL SECTOR OF INSTITUTIONS FOR SHORT-TERMHOSPITALIZATION IN NIŠAVA AND TOPLICA DISTRICTS FROM 2010. TO 2014.

Saša Ristić, Nikolić D

Public Health Institute Niš, Serbia

The aim is to critically review the use of beds in the surgical sector (general surgery), in health institutions for short-term hospitalization in Nisava and Toplica Districts through the annual performance during the period between 2012 and 2014.
Methodology and data sources: retrospective- comparative social medical scientific method was applied to the data from the annual reports on the performance of the work plan.
What emerges from the aforementioned is that there is a decline use of available beds at tertiary level, with an attempt for correction by increasing the length of hospital stay, stating that despite the fall there is a significantly higher average occupancy than at the secondary level (the reason is reduction of the number of hospitalized patients in 2014 compared to the previous period). On the other hand, if we take the average number of hospitalized patients by medical doctors, the heaviest burden fell on general surgery in GH Aleksinac.
Conclusion: To further improve the work of infirmaries, it is necessary to introduce appropriate solutions that are already specified in the developed health care systems:
Activate the operational management of medical institutions with information received timely, which are obtained by monitoring the work of infirmaries, and detect deviations from standards and planned activities, in order to take corrective measures at the level of organizational units.
It is necessary to produce and analyze information at the local level (institution - organizational unit) at least quarterly, along with the coordination with the Institute for Public Health, the conclusions of which would be available to those who collect data in order to increase their motivation (respect the cycle of feedback).
Planning work of infirmaries or the methodology of planning as the basis of good performance, must be more uniform and accurate and the evaluation of work in hospitals must be more transparent. It is necessary to regularly hold professional meetings, and training for people who work in planning analytics to improve the quality of hospital health care

6. ORGANIZATION OF GYNECOLOGICAL CLINIC OF CLINICAL CENTER NIŠ

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Clinic of Gynecology and Obstetrics in Nis is a highly specialized institution of the tertiary level of health care that deals with the diagnosis and treatment of gynecological diseases, pathology of pregnancy, childbirth, gynecological endocrinology, infertility, juvenile and adolescent gynecology, artificial insemination, minimally invasive surgery, modern neonatology, modern methods of early detection and treatment of pre-malignant and malignant diseases in the genital organs. Clinic carries out educational and scientific-research activity (in accordance with the law).

Annually it has been hospitalized about 8,000 patients, with an average length of treatment of 7 days. Approximately 1,500 operations are done and 3,200 births; providing approximately 150,000 outpatient polyclinic services with 65,000 ”patient days”.

They apply modern methods of diagnosis and therapy there, such as:
• Early prenatal detection of fetal anemia
• Early detection of malignancy of the genital tract
• New methods of minimally invasive endoscopic surgery (laparoscopic and operative hysteroscopy)
• Doppler sonography and application of 3D and 4D technology.
• Modern surgical treatment of incontinence and genital organ failure.

Conclusions and suggestions of measures to improve the work:
• A small number of gynecological surgery, because of the waiting period; narrow spectrum of surgical interventions
• It is a large number of patients who are sent to other facilities associated with the pathology that should be resolved here
• An insufficient number of doctors and nurses, lack of necessary staff
• Planning to devise continuous improvement (endoscopy)
• Provide adequate and dedicated space for ambulatory surgery service.