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**STROKOVNO POSVETOVANJE OB MEDNARODNEM DNEVU
ENO ZDRAVJE**

3. november 2016, Nacionalni inštitut za javno zdravje, Zaloška 29, 1000 Ljubljana

**ENO ZDRAVJE
»ONE HEALTH«**

ZBORNİK IZVLEČKOV

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ZBORNIKU NA POT

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S strokovnim posvetovanjem ob mednarodnem dnevu "Eno zdravje", ki je bilo namenjeno širokemu krogu strokovnjakov različnih ved, ki delujejo na področju varovanja zdravja ljudi in živali, smo strnili najpomembnejše vsebine.

Več kot 60 odstotkov znanih nalezljivih bolezni uvrščamo med zoonoze. Zaradi medsebojnega vpliva za zdravje ljudi in živali je izjemno pomembno sodelovanje humane in veterinarske medicine.

Namen posvetovanja je bil predstavitev novosti, izsledkov raziskav in oblikovanje predlogov za skupno doseganje ciljev, ki so poudarjeni v strateških dokumentih mednarodnih organizacij in tudi Slovenije.

V duhu slogana mednarodnega dne »Eno zdravje«, smo vsako od obravnavanih tem kot so bolezni, ki se prenašajo s hrano in vodo, vektorske nalezljive bolezni, steklina, dermatofitoze, influenza, odpornost bakterij proti antibiotikom prikazali z vidika varovanja zdravja ljudi in živali.

Poudarjena je bila potreba po bolj učinkovitem in poenotenem delovanju vseh deležnikov. V prihodnje bo treba več vlagati v krepitev medsebojnega obveščanja, kadrovske kapacitete in sistem hitreje prilagajati novim potrebam.

Na posvetovanju smo preverili kaj nam je uspelo, kaj novega smo v zadnjih letih odkrili, kaj smo se naučili in kam moramo v prihodnje usmeriti več pozornosti.

Verjamem, da smo izkoristili to enkratno priložnost, ko smo se zbrali vsi, ki delujemo na področju zoonoz in iščemo poti, ki vodijo do krepitve zdravja ljudi in živali.

Zaradi velikega pomena takih strokovnih dogodkov, smo sprejeli odločitev, da se bomo srečevali vsako leto.

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SPREMLJANJE POJAVLJANJA ZONOOZ IN OBVEŠČANJE MED UVHVVR IN NIJZ

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Uvod: Zoonoze so nalezljive bolezni, pri katerih je možen prenos iz živali na ljudi in tudi v obratni smeri. Pri preprečevanju širjenja zoonoz je potrebno upoštevati zapletene interakcije med ljudmi, živalmi in okoljem, zaradi česar je spremljanje zoonoz kompleksen proces. Za spremljanje in preprečevanje zoonoz, ki je pomemben javnozdravstveni problem, je nujno sodelovanje različnih sektorjev. Potreba po obveščanju in postopek obveščanja o pojavljanju zoonoz med različnimi inštitucijami (UVHVVR in NIJZ) se v regijah po Sloveniji razlikuje in je v določenih primerih nejasen. Namen prispevka je predstaviti zakonodajo s področja spremljanja zoonoz ter pripraviti predlog postopka obveščanja med UVHVVR in NIJZ za bolj učinkovito in poenoteno obveščanje.

Metode: Pregledali in analizirali smo trenutno stanje obveščanja med UVHVVR in NIJZ. Opravili smo tudi pregled zakonodaje s področja spremljanja zoonoz v Sloveniji ter obveščanja med pristojnimi inštitucijami. Pregledali smo seznam zoonoz, ki so vključene v program monitoringa na podlagi Pravilnika o monitoringu zoonoz in povzročiteljev zoonoz, ki je v skladu z Direktivo Evropskega parlamenta in Sveta o monitoringu zoonoz in povzročiteljev zoonoz št. 2003/99/ES. Prav tako smo pregledali seznam zoonoz v publikaciji Guidelines for the Investigation of Zoonotic Disease (non-foodborne) in England and Wales, ki jo je pripravila Skupina za humane in živalske okužbe in nadzor tveganja (Human Animal Infections and Risk Surveillance group). Na podlagi določenih kriterijev (resnost bolezni, možne poti prenosa okužbe in možnosti epidemiološkega ukrepanja za obvladovanje in preprečevanje zbolevanja ljudi) smo uvrstili zoonoze v skupine glede na periodiko potrebnega obveščanja med UVHVVR in NIJZ.

Rezultati: Identificirali smo 51 epidemiološko pomembnih zoonoz, ki smo jih razvrstili v skupine glede na nujnost poročanja o pojavu bolezni. Uvrstili smo jih v skupino, kjer bi bilo potrebno ob sumu na pojav ali potrditvi bolezni pri živali takojšnje obveščanje NIJZ-ja s strani UVHVVR-ja, ali v skupino, kjer bi bilo potrebno takojšnje obveščanje NIJZ-ja s strani UVHVVR-ja o sumu ali potrditvi povzročitelja zoonoze v živilih, ali v skupino, kjer bi bilo ob sumu na pojav ali potrditvi bolezni pri živali ali v živilu potrebno obveščanje NIJZ-ja s strani UVHVVR-ja enkrat mesečno.

Zaključek: Za dober in učinkovit sistem spremljanja in preprečevanja zoonoz je ključna komunikacija med pristojnimi inštitucijami. Trenutno vzpostavljen način obveščanja med UVHVVR in NIJZ je neenoten. Na podlagi pregleda zoonoz smo pripravili predlog obveščanja med UVHVVR in NIJZ, ki bo omogočal boljše sodelovanje teh inštitucij in bolj učinkovito preprečevanje širjenja zoonoz.

MONITORING OF ZONOTIC DISEASES AND REPORTING BETWEEN COMPETENT INSTITUTIONS

Background: Zoonoses are infectious diseases, which are transmissible from animals to humans and vice-versa. There are complex interactions between humans, animals and the environment that must be considered in prevention and control of zoonotic diseases. Zoonoses present an important public health issue and cross sectoral collaboration is crucial in monitoring and prevention of zoonotic diseases. Reporting about zoonoses between different competent institutions in Slovenia (Administration of the Republic of Slovenia for Food Safety, Veterinary Sector and Plant Protection – UVHVVR and National Institute of Public Health - NIJZ) differs in different regions across Slovenia. The purpose of this article is to summarize legislation regarding monitoring and prevention of zoonotic diseases in Slovenia and to suggest a reporting process between Administration of the Republic of Slovenia for Food Safety, Veterinary Sector and Plant Protection and National Institute of Public Health in order to create a more efficient and unified information exchange process.

Methods: We studied and analysed the current process of reporting between UVHVVR and NIJZ. We studied the legislation regarding zoonotic diseases in Slovenia and legislation regarding communication between competent institutions. We then studied a list of zoonotic diseases, included in the monitoring programme in Slovenia, which is prepared in accordance with the Rules on the monitoring of zoonoses and zoonotic agents and the Directive 2003/99/EC of the European Parliament and of the Council. We also studied a list of zoonotic diseases found in the publication Guidelines for the Investigation of Zoonotic Disease (non-foodborne) in England and Wales, written by the Human Animal Infections and Risk Surveillance group. We classified zoonotic diseases in groups according to the urgency of reporting, considering disease severity, routes of transmission and the possibility of implementing epidemiologic interventions for control and prevention of zoonoses spreading to humans.

Results: We identified 51 epidemiologically significant zoonoses and classified them in groups, according to the urgency of reporting. We placed zoonotic diseases in a group where communication between UVHVVR and NIJZ about zoonosis occurrence in animals should be immediate, or in a group, where UVHVVR should report immediately to NIJZ about zoonotic agent occurrence in food, or in a group, where reporting about zoonosis and zoonotic agents occurrence in animals or in food once a month is sufficient.

Conclusions: A good communication process between competent institutions is essential for an effective surveillance and response system for zoonotic diseases. The current reporting procedure between UVHVVR and NIJZ is not uniform in different regions in Slovenia. We presented a new and improved reporting procedure between UVHVVR and NIJZ with the purpose of improving the collaboration of the two institutions and improving zoonotic disease prevention.

BOLEZNI ŽIVALI IN ZOONOZE - OBVEŠČANJE, POROČANJE IN SODELOVANJE

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Bolezni živali oziroma zoonoze, ne vplivajo le na zdravje živali, temveč imajo velik pomen tudi za zdravje ljudi. Že dolgo je poznano, da se določene bolezni prenašajo na različne načine iz živali na ljudi in obratno. Prenašajo se lahko neposredno, preko kontakta z okuženo živaljo ali posredno, preko uživanja surovin in izdelkov, ki izvirajo od okuženih živali, preko različnih prenašalcev – komarjev, netopirjev, rejnih živali, hišnih živali, ptic, primatov

Ključnega pomena je, da bolezen pri živalih čimprej ugotovimo, o tem obvestimo zdravstveno službo in skupno ukrepamo, da zaščitimo zdravje in življenje ljudi.

Za pripravo in učinkovito ukrepanje morajo biti informacije o pojavih bolezni živali oziroma zoonoz na voljo tako na lokalni ravni kot tudi globalno, saj se le na tak način lahko pri pojavu oziroma nevarnosti pojava epidemij oziroma pandemij veterinarske in zdravstvene službe ustrezno pripravijo na ukrepanje oziroma pripravijo preventivne ukrepe, da bi se vpliv bolezni na zdravje in življenje predvsem ljudi, zmanjšal.

Zaradi pomena, ki ga ima pravočasna informacija o pojavu bolezni so postopki obveščanja in poročanja predpisani in regulirani in jih morajo tako veterinarske kot zdravstvene oblasti izvajati, da bi zagotovile učinkovito ukrepanje ob povečanem tveganju ali pojavu bolezni.

ANIMAL DISEASES AND ZOOSES - NOTIFICATION, COMMUNICATION AND COOPERATION

Animal diseases and zoonoses, not only affect the health of animals, but have a major impact on human health as well. It has long been known that certain diseases are transmitted in different ways from animals to humans, and vice versa. They can be directly transmitted through contact with an infected animal or indirectly through the consumption of products derived from infected animals, through various vectors - mosquitoes, bats, farm animals, pets, birds, primates

It is of crucial importance to detect disease in animals as early as possible, to inform human health services thereof and to react and act jointly to protect health and life of people.

For the preparation and effective action, the information on the occurrence of animal diseases and zoonoses must be available both locally as well as globally. In this way only, the veterinary and health services could be adequately prepared and necessary actions or preventive measures implemented in case of threat or the occurrence of epidemics or pandemics, in order to minimise the impact of the disease on the health and lives of people in particular.

Given the importance that timely information on the occurrence of disease has, the notification and reporting procedures are prescribed and regulated and should be followed by both, the veterinary and health authorities to ensure effective action at increased risk or appearance of the disease.

KAMPILOBAKTRSKI GASTROENTEROKOLITIS: PORAJAJAJOČA SE ZOOZOZA?

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Uvod: Kampilobaktri so najpogostejši, zoonotični, bakterijski povzročitelji drisk v Evropi in Sloveniji. Namen prispevka je prikazati epidemiološko situacijo v Sloveniji in skupaj z veterinarskim resorjem poiskati možnosti za izboljšanje.

Rezultati: Kampilobakter je bil v letu 2015 v Sloveniji, podobno kot v številnih državah EU, najpogostejši bakterijski povzročitelj enteritsov. Število prijav v letu 2015 (1249) je za 11,5 % višje kot leta 2014. Pri ljudeh je najpogostejši *Campylobacter jejuni*, ki predstavlja (80 % prijav), *Campylobacter consisus* (8,8 %), *Campylobacter coli* (6,7 %), *Campylobacter curvus* (2,7 %) in drugi.

Letna incidenčna stopnja kampilobaktrskih okužb v Sloveniji je v letu 2015 znašala 60,5/100.000 prebivalcev in je za 9 % višja od 10-letnega povprečja. Incidenca je v državah EU (zadnji podatki so na voljo za leto 2014) znašala 71,0 / 100 000 prebivalcev in je v primerjavi z letom 2013 porasla za 9,6%. Najvišje incidence so zabeležili na Češkem (197,4/100 000 prebivalcev), v Luksemburgu (158,8/100 000 prebivalcev), na Slovaškem (124,5/100 000 prebivalcev) in Angliji (103,9/100 000) prebivalcev.

V juliju in avgustu 2016 je šest držav EU, med njimi tudi Slovenija, poročalo o porastu kampilobaktrskih okužb (5-33%) glede na enako obdobje v letu 2015. Porast incidence je v nekaterih državah verjetno posledica boljše diagnostike – oziroma ponekod uvedbe PCR. V drugih državah, vključno v Sloveniji, kjer je bil porast 10%, razlog ni znan.

Zaključek: Epidemiološka situacija kampilobaktrskega gastroenterokolitisa v Sloveniji se v zadnjih letih ne izboljšuje, zato je potrebno preprečevanje okužb z osredotočanjem na rizične skupine prebivalstva, zgodnje odkrivanje in obvladovanje izbruhov, osveščanje potrošnikov o varnem ravnanju s perutnino ter sodelovanje z drugimi resorji.

CAMPYLOBACTER GASTROENTEROCOLITIS: EMERGING ZONOSIS?

Background: Campylobacters are the most common zoonotic, bacterial cause of acute gastroenterocolitis in Europe and Slovenia as well. The purpose of presentation is to show epidemiological situation in Slovenia and find possibilities for improvement with veterinary sector.

Results: *Campylobacter* was in 2015 like in many EU countries the most common bacterial cause of gastroenteritis in Slovenia. The number of notifications in the year 2015 (1249) is 11.5% higher than in 2014. In humans is the most common *Campylobacter jejuni* which represents (80%), *Campylobacter consisus* (8.8%) and *Campylobacter coli* (6.7%), *Campylobacter curvus* (2.7%) and others. In July and August 2016, six EU countries, including Slovenia, reported an increase of *Campylobacter* infections (from 5 to 33%) compared to the same period in 2015. The increase in incidence in some countries was probably due to better diagnosis - or in some cases the introduction of PCR. In other countries also in Slovenia (10% increase) the reason remained unknown.

Conclusion: Epidemiological situation of *Campylobacter* gastroenteritis in recent years has not improved, there is need for target prevention measures with focus on identified risk groups, early detection and management of outbreaks, improving consumer awareness about safe handling of poultry and cooperation with other sectors.

KAMPILOBAKTRI – OD ŽIVALI PREKO HRANE NA LJUDI

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Kampilobakteriozo kot alimentarno zoonozo najpogosteje povezujemo z uživanjem kontaminiranega perutninskega mesa. Najpogostejša povzročitelja obolenj sta *C. jejuni* in *C. coli*, sledijo *C. consisus*, *C. curvus*, *C. upsaliensis* in *C. lari*. Perutnina je kot možen vir teh obolenj na prvem mestu ob ugotovitvah, da je prevalenca povzročiteljev v jatah brojlerjev zelo visoka. V procesu klanja teh živali se je za zdaj praktično nemogoče izogniti kontaminaciji samega piščančjega mesa. V letu 2014 je bila v Sloveniji med vzrejo ugotovljena 60 % razširjenost mikrobov in skoraj enaka je bila tudi kontaminacija piščančjega mesa, dostopnega v prodaji. Kritične točke za kontaminacijo trupov se med zakolom okuženih živali pojavijo že na samem začetku linije klanja in so prisotne vse do konfekcioniranja piščančjih trupov. Poleg gojene perutnine predstavlja vir okužbe tudi govedo (v primeru uživanja kontaminiranega mleka); ostale domače in divje živali ter okoljski viri povzročijo le majhno število obolenj. Kljub vsemu ob pojavu kampilobakterioznih obolenj ne smemo pozabiti na morebitno hidrično okužbo ali na prenos teh bakterij preko hišnih ljubljencev. Dosedanje raziskave in izvedeni projekti so pokazali, da igra trenutno največjo vlogo pri zmanjševanju stopnje kontaminacije piščančjega mesa izboljšanje biovarnostnih ukrepov med samo vzrejo živali. Odločilno vlogo pri zmanjševanju števila kampilobakterioznih obolenj pa bi vsekakor morala odigrati tudi (ali predvsem) priprava jedi tako v gostinskih objektih kot v domačem okolju.

CAMPYLOBACTERS FROM ANIMALS THROUGH FOOD TO HUMANS

Campylobacteriosis as food-borne zoonoses is most commonly associated with the consumption of contaminated poultry meat. The causes of disease are *C. jejuni* and *C. coli*, followed by *C. consisus*, *C. curvus*, *C. upsaliensis* and *C. lari*. As the possible source of disease is poultry in the first place, considering that the prevalence of pathogens in broiler flocks is very high. In the slaughtering process of these animals it is for the time being practically impossible to avoid contamination of chicken meat itself. In 2014 in Slovenia the prevalence of campylobacters of animals during breeding, was found 60%. Almost equal was the contamination of chicken meat, accessible on the market. Critical points for contamination of carcasses during slaughter of infected animals occur at the beginning of the slaughter line and they are present during all operation steps (cutting, retail). Beside to farmed poultry also the cattle is a possible source of infection (in the case of the consumption of contaminated milk). Other domestic and wild animals and environmental sources caused only a small number of diseases. Nevertheless, at the appearance of campylobacteriosis we have not to forget the potentially water-borne infection or transmission of these bacteria over pets. Previous studies and projects carried out show that currently play the largest role in reducing the level of contamination of chicken meat improvement of bio-security measures during the breeding animals. A decisive role in reducing the number of campylobacteriosis should in any case have to play even (or especially) the preparation of dishes, both in hotels and restaurants and in the home environment.

SISTEM SPREMLJANJA CREUTZFELDT - JAKOBOVE BOLEZNI IN EPIDEMIOLOŠKA SITUACIJA V SLOVENIJI

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Uvod: Prionske bolezni so redke nevrodegenerativne bolezni, ki nastanejo zaradi kopičenja prionov v osrednjem živčevju. Glavni namen vzpostavitve sistema spremljanja prionskih bolezni pri ljudeh je zaznavanje variantne oblike Creutzfeldt - Jakobove bolezni (vCJB). Obstaja tveganje za prenos povzročitelja BSE na človeka s hrano živalskega izvora. Zato je potrebno sodelovanje različnih strokovnih področij, tako humane kot veterinarske medicine. V Sloveniji je bil leta 1996 vzpostavljen sistem aktivnega zbiranja podatkov o pojavljanju prionskih bolezni pri ljudeh.

Metode: Učinkovit sistem spremljanja prionskih bolezni predstavlja intenzivno in usklajeno interdisciplinarno delo nevrologov, psihiatrov, epidemiologov, patologov, transfuziologov, infektologov in družinskih zdravnikov. Slovenija sodeluje v evropskem sistemu sledenja vseh oblik CJB in je leta 2007 ustanovila strokovno interdisciplinarno skupino (SSCJB) za koordinacijo sledenja, klasifikacijo in obvladovanje te nalezljive bolezni. Sistem spremljanja pojavnosti CJB je vpet v že obstoječi, z zakonom predpisan splošni sistem spremljanja nalezljivih bolezni v državi. NIJZ je centralna točka zbiranja prijav in baze podatkov.

Rezultati: V obdobju 1996 do konca leta 2015 je bilo v bazi podatkov zabeleženih 113 prijav. Od tega je bilo 57 potrjenih primerov sporadične oblike Creutzfeldt - Jakobove bolezni (sCJB). Incidenčna stopnja sCJB za to obdobje je 1,4 primera na milijon prebivalcev na leto. Z obdukcijo je bilo ovrženih 29 primerov suma na CJB, dva primera suma sta bila klinično ovržena še v času življenja bolnikov. Po smrti bolnikov s sumom na CJB jih 11 ni bilo obduciranih. Zabeležili smo tudi eno potrjeno dedno obliko CJB in dva primera Gerstman-Straussler-Scheinkerjevega sindroma (GSS). V Sloveniji primera variantne oblike CJB (vCJB) pri ljudeh do sedaj še nismo zaznali in dokazali.

Zaključek: Sistem spremljanja CJB v Sloveniji je primerljiv s sistemi v drugih evropskih državah in zagotavlja ustrezno diagnostično in javnozdravstveno ukrepanje ob pojavu morebitnega tveganja za zdravje ljudi. Krepitev redne komunikacije med sistemi spremljanja prionskih bolezni v humani in veterinarski medicini bi nedvomno doprinesla še večjo učinkovitost

spremljanja prionskih bolezni ter ukrepanja ob zaznanih tveganjih za javno zdravje v slovenskem prostoru.

SURVEILLANCE OF CREUTZFELDT - JAKOB DISEASE AND EPIDEMIOLOGICAL SITUATION IN SLOVENIA

Introduction: Prion diseases are rare neurodegenerative diseases caused by the accumulation of prions in the central nervous system. The main purpose of setting up a system of monitoring prion diseases around the world is in detection of Variant Creutzfeldt-Jakob disease (vCJD). There is a risk of transmitting the BSE agent to humans through food of animal origin. A cooperation between different professional fields – human and veterinary medicine - is therefore necessary. Surveillance of prion diseases includes interdisciplinary approach and cooperation between different areas of expertise. In Slovenia an active surveillance of prion diseases was established in 1996.

Methods: An intensive and coordinated interdisciplinary work of neurologists, psychiatrists, epidemiologists, transfusiologists and pathologists is needed to assure the effectiveness of the surveillance system. Slovenia cooperates in the European CJD surveillance system. The legal foundations were adopted in Slovenia in 2007 and a professional interdisciplinary group was established to coordinate the surveillance, classification, assessment and control of CJD. The CJD surveillance system is integrated in the legally adopted national general surveillance system for communicable diseases. NIJZ is the central point for applications and databases.

Results: During the period from 1996 to the end of 2015 there were 113 recorded applications. Out of these, 57 were confirmed cases of Sporadic Creutzfeldt-Jakob disease (sCJD). Incidence rate of sCJD for this period of time was 1,4 cases per million inhabitants per year. After autopsy 29 cases of suspected sCJD were discarded and two suspected cases were clinically refuted during the life of the patients. In eleven suspected sCJD cases the autopsy had not been performed. There is also recorded one confirmed genetic CJD (f/gCJD) and two cases of Gerstman-Straussles-Scheinker syndrome (GSS). The variant CJD (vCJD) in humans have not been detected and proven in Slovenia so far.

Conclusions: The surveillance system in Slovenia is comparable to the systems in other European countries and provides appropriate diagnostic and response to a potential risk for public health. Strengthening of regular and constant communication between surveillance systems of prion diseases in human and veterinary medicine would undoubtedly contribute to even more effective monitoring of prion diseases and responding to perceived risks for public health in Slovenian region.

SPREMLJANJE ŽIVALSKIH TSE V SLOVENIJI IN EPIZOOTIOLOŠKA SITUACIJA

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Uvod: Prenosljive ali transmisivne spongiformne encefalopatije (TSE) so prionske bolezni, za katere v Sloveniji spremljamo stanje in izvajamo intenziven nadzor od leta 2001, pri čemer upoštevamo smernice in predpise Evropske skupnosti in uporabljamo odobrene diagnostične metode. Med živalskimi boleznimi iz te skupine so najpomembnejše tri: bovina spongiformna encefalopatija (BSE) pri govedu, praskavec pri drobnici in bolezen kroničnega hiranja (CWD) pri jelenjadi. BSE je za zdaj edina med njimi, ki je ocenjena kot zoonoza. V Sloveniji se izvaja preiskave na BSE in TSE po programu, ki ga vsako leto objavi Uprava Republike Slovenije za varno hrano, veterinarstvo in varstvo rastlin (UVHVVR).

Metode: TSE je mogoče diagnosticirati samo po smrti živali. Za spremljanje stanja (monitoring) opravljamo preiskave možganov dovzetnih živali (govedo, drobnica, jelenjad) s hitrimi postmortalnimi testi, za potrjevanje v sumljivih primerih pa patohistološko ter imunohistokemično metodo in metodo western blot.

Rezultati: Od leta 2001 smo s hitrimi postmortalnimi testi pregledali 475.097 goved, 23.050 ovac, 5.978 koz in 360 drugih vrst živali (jelenjad, eksotična goveda). Potrdili smo 8 primerov klasične BSE in en primer atipične BSE (H-tip), 174 primerov klasičnega praskavca pri ovcah in 4 pri kozah ter 10 primerov atipičnega praskavca pri ovcah in enega pri kozah. Pri jelenjadi do zdaj nismo ugotovili pozitivnega primera.

Zaključek: Klasična BSE je bila z uspešnimi ukrepi v Evropi skoraj povsem zatrta, še vedno se pojavljajo sporadični primeri atipičnih oblik BSE, ki jih zaradi opuščanja obveznega testiranja redno zaklanih govedi skoraj nikjer ne najdejo več in se zato lahko pojavljajo v prehranski verigi. Po doslej znanih podatkih praskavec ni nevaren ljudem, se pa za prehrano ljudi iz preventivnih razlogov ne uporabljajo najbolj rizični organi in tkiva. Na Norveškem so letos potrdili prve primere CWD v Evropi in sicer pri 3 severnih jelenih in 2 losih, tako da bo treba v prihodnjih letih posvetiti več pozornosti tudi tej bolezni.

SURVEILLANCE OF ANIMAL TSE AND EPIZOOTIC SITUATION IN SLOVENIA

Background: Transmissible Spongiform Encephalopathies (TSEs) are Prion diseases which have under observation of guidelines and regulations of the European Union and using the approved diagnostic methods been monitored and intensively controlled in Slovenia as from 2001. From animal diseases of this group, three are most important: Bovine Spongiform Encephalopathy (BSE) in bovine animals, Scrapie in small ruminants and Chronic Wasting Disease (CWD) in deer. To date, only BSE has been evaluated as a zoonosis. In Slovenia, the BSE- and TSE-testing is conducted according to a programme published on an annual basis by the Administration of the Republic of Slovenia for Food Safety, Veterinary Sector and Plant Protection (AFSVSPP).

Methods: TSE can be diagnosed post mortem only. For monitoring purposes, the brain of susceptible animals (bovines, small ruminants and deer) is subjected to testing, using the rapid post-mortem tests, and for confirmation in suspect cases, the histopathology, immunohistochemistry and Western blot.

Results: As from 2001, 475,097 bovine animals, 23,050 ovine animals, 5,978 caprine animals, and 360 animals of other species (deer, exotic bovines) have been subjected to rapid post-mortem testing. We confirmed 8 Classic BSE cases and a single Atypical (H-type) BSE case, 174 Classical Scrapie cases in ovine animals, 4 Classical Scrapie cases in caprine animals, 10 Atypical Scrapie cases in ovine animals and a single Atypical Scrapie case in a caprine animal. In deer, no positives have been identified to date.

Conclusions: Classical BSE has through effective measures been eradicated in Europe almost entirely. There may occur sporadic Atypical BSE cases. Owing to discontinuation of compulsory testing of healthy slaughtered bovine animals, these are almost never identified and may enter the food chain. According to information available to date, Scrapie does not pose a threat to human health. However, as a preventive measure, most hazardous animal organs and tissues are excluded from human consumption. In Norway, CWD cases were confirmed this year in 3 reindeer and 2 elks. This is the first detection of CWD in Europe. In the years to come, more attention will need to be dedicated to this disease as well.

VIRUS ZAHODNEGA NILA - SPREMLJANJE IN OBVLADOVANJE

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Uvod: Vektorske bolezni predstavljajo resno grožnjo zdravju ljudi in živali. Ob podnebno pogojenemu spreminjanju biotskih, abiotskih dejavnikov in socio-ekonomskih okoliščin se lahko nepričakovano razširijo. V prispevku bomo predstavili epidemiološke značilnosti virusa Zahodnega Nila (angl. West Nile virus, WNV) v Evropi in svetu ter odziv javno-zdravstvenih inštitucij na njegovo širjenje.

Virus Zahodnega Nila je v sredini prejšnjega stoletja povzročil epidemičen pojav vročinske bolezni in encefalitisa v državah Bližnjega vzhoda. Nekoliko kasneje so se pričeli pojavljati izbruhi v Afriki, Evropi in Aziji. Posebno presenečenje je bil pojav WNV v ZDA – prvi primeri nevroinvazivne oblike okužbe z WNV so bili l. 1999 v New Yorku. Virus Zahodnega Nila se je v naslednjih petih letih razširil po vseh zveznih državah ZDA in proti severu v Kanado. V dobrem desetletju po prvem dokazanem primeru v ZDA se je WNV brez večjih težav razširil preko Srednje Amerike do juga Argentine.

V evropski regiji je bilo v zadnjih dvajsetih letih največ primerov v Romuniji, ob izlivu reke Volge v južni Rusiji in od l. 2012 tudi v Srbiji. Primere WNV pri ljudeh so potrdili v vseh državah, ki mejijo na Slovenijo. Območje Slovenije je uvrščeno kot območje z možnostjo pojava WNV (angl. predisposed area), saj obstajajo naravne danosti v okolju, ki omogočajo obstoj prenašalca *Culex pipiens*. V Sloveniji prisotnost WNV v komarjih in pri domačih živalih ni bila dokazana, potrdili pa so jo pri prostoživečih pticah. Doslej je bil potrjen zgolj en primer okužbe z WNV pri ljudeh.

Zaključek: Epidemiološki, epizootološki in entomološki podatki sosednjih držav nakazujejo možnost širjenja WNV v Sloveniji, zato je bil l. 2015 v okviru medresorske skupine izdelan *Načrt pripravljenosti na pojav virusa Zahodnega Nila v Sloveniji* kot izhodiščni dokument za ukrepanje.

WEST NILE VIRUS - SURVEILLANCE AND RESPONSE

Background: Vector-borne diseases pose a serious threat to human and animal health. Climate change might trigger modification of biotic, abiotic factors and socio-economic circumstances which will back-up an unexpected extension of vector borne diseases. Global epidemiology of West Nile virus (WNV) is described and the response of public health institutions revealed.

West Nile virus was a cause of multiple outbreaks of febrile illness or encephalitis in Middle Eastern countries in the middle of the last century. Later, the outbreaks began to appear in Africa, Europe and Asia. West Nile virus infections suddenly emerged in the United States - the first cases of neuroinvasive forms of infection have been notified in year 1999 in New York. In the next five years, West Nile virus has spread across US states and northward into Canada. In just over a decade after the first proven case in the United States, WNV cases have occurred in Central America and in the most southern part of Argentina.

In last twenty years, the number of cases increased in European region. Most of the cases were notified in Romania, at the Volga River delta in southern Russia and from I. 2012 in Serbia. WNV cases in humans has been confirmed in all countries bordering Slovenia. Slovenian territory is classified as an area with the possibility of the emergence of WNV (predisposed area), because there are natural conditions in the environment, allowing the existence of the vector *Culex pipiens*. In Slovenia, the presence of WNV in mosquitoes and in domestic animals has not been demonstrated. WNV has been found in wild birds only. So far there was one confirmed human case of WNV in Slovenia.

Conclusion: The WNV epidemiology, epizootology and entomological data in neighboring countries indicate the possibility of the spread of WNV in Slovenia. Within the framework of the inter-sectorial group, Slovenian West Nile virus preparedness plan has been launched as a basis for surveillance and response.

DEJAVNOST ZDRAVSTVENE SLUŽBE ZA ZAŠČITO LJUDI PRED STEKLINO

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Postopki preprečevanja stekline v Sloveniji so učinkoviti. Stekline pri ljudeh, kot rezultat uspešnega dela veterinarske in zdravstvene službe, ni že od leta 1950. To stanje ni le posledica izboljšanja epizootiološke situacije, do katerega je prišlo predvsem zaradi peroralnega cepljenja lisic proti steklini, temveč tudi nenehne dejavnosti antirabičnih ambulant.

Zdravstvena služba skrbi za zaščito ljudi pred steklino v skladu z obstoječimi predpisi in strokovnimi priporočili. Izvajajo se preventivna cepljenja izpostavljenih oseb. V primeru poškodb s strani živali rane poškodovancev oskrbijo v splošnih ambulatah. V antirabični ambulanti na osnovi ocene tveganja, če veterinarski nadzor živali ni možen, poškodovanec prejme cepivo proti steklini in po potrebi tudi humane antirabične imunoglobuline.

Podatki kažejo, da je bilo v obdobju od leta 1992 do 2015 v antirabičnih ambulatah obravnavanih povprečno 3326 oseb na leto. Odločitev za postekspozicijsko cepljenje proti steklini je bila v povprečju sprejeta v 23,4 % primerov obravnav, humani imunoglobulin proti steklini pa je v povprečju prejelo 6,5 % cepljenih proti steklini. Postekspozicijsko cepljenje ljudi je bilo v 63 % potrebno zaradi ugrizov psa neznanega lastnika.

Kljub ugodnejši epizootiološki situaciji v Sloveniji v zadnjih letih smo se v primerih, ko suma na steklino nismo mogli ovreči, odločali za poekspozicijsko cepljenje ljudi. Ob dejstvu, da je steklina smrtna bolezen, cepljenje pa varno in učinkovito, so nas namreč k temu zavezovali predpisi.

Slovenija je v letošnjem letu izpolnila pogoje Svetovne organizacije za zdravje živali (OIE) in se proglasila za državo, prosto stekline.

V antirabičnih ambulatah opozarjamo, da je za oceno tveganja in ukrepanje pri poškodbah s strani živali ob statusu države brez stekline potrebno spremeniti definicijo suma na steklino. Predlagamo, da razjasnjevanje okoliščin ugrizov z lastniki živali prevzamejo območni uradi UVHVVR. Potrebno je presoditi zahtevo po obveznosti veterinarskega nadzora živali, ki človeka poškodujejo v Sloveniji. Zavedamo se, da zaradi velike migracije ljudi in živali obstaja stalna

nevarnost vnosa stekline iz endemskih držav, zato bo v takšnih slučajih nujno ukrepati v skladu s strokovnimi priporočili.

Status države proste stekline bo Slovenija obdržala le z nadaljnjim izvajanjem dokazano učinkovitih preventivnih veterinarskih ukrepov (registracija in obvezno cepljenje psov, cepljenje lisic, opazovanje epidemiološkega vzorca stekline pri živalih, vključno z netopirji) ter razmeram prilagojeno antirabično obravnavo poškodovancev. S tem bomo prispevali k ohranjanju zdravja in življenj tako ljudi kot živali.

ACTIVITY OF HEALTH SERVICES TO PROTECT PEOPLE AGAINST RABIES

Methods for the prevention of rabies in Slovenia are effective. As a result of a good cooperation between veterinary and health services Slovenia is free of human rabies since 1950. This situation is not only due to an improvement of the epizootiological situation, which has occurred mainly after the oral vaccination of foxes against rabies, but also because of constant activities of specialized antirabies outpatient departments.

Health care services protect people from rabies in accordance with existing regulations and professional recommendations. Preventive vaccination of exposed persons is implemented. In case of injury by animal wounds are cared for in general outpatient departments. Based on a risk assessment, if the veterinary supervision of the animal is not possible, in antirabies outpatient department the injured person gets the vaccine against rabies and, if necessary, human antirabies immunoglobulins.

Data show that in the period from 1992 to 2015 the number of treated persons in antirabies outpatient departments is on average 3326 per year. The decision for the post-exposure vaccination against rabies was made in an average of 23,4% of treated persons and for the application of human rabies immunoglobulin in 6,5 % of vaccinated persons. In 63 % of the cases, postexposure vaccination was necessary due to the bites caused by a dog of an unknown owner.

Despite the favorable epizootiological situation in Slovenia in recent years, we have decided for the postexposure vaccination of people in cases when the suspicion of rabies was not able to refute. We were obliged to regulations to do so, because the fact is that the rabies is a fatal disease, but vaccination is safe and effective.

Slovenia has met the criteria of World Organization for Animal Health (OIE) this year and the country was declared free of rabies.

It is necessary to change the definition of suspicion of rabies in the status free country, because the risk assessment and take action in case of injuries by the animal are based on it. It is suggested that the regional offices of Administration of the Republic of Slovenia for Food Safety, Veterinary Sector and Plant Protection will take the clarification of circumstances of bites with animal owners. It is necessary to assess the request of obligations of veterinary inspection after animals injured people in Slovenia.

We are aware that due to the migration of people and animals, there is a permanent risk of imported rabies from endemic countries. In such a case, we need to act urgently in accordance with professional recommendations.

Status of the country free of rabies Slovenia will be kept only by continuing of a proven effective preventive veterinary measures (registration and compulsory vaccination of dogs, vaccination of foxes, observing the epizootiological pattern of rabies in animals, including bats), and antirabies treatment of the injured adapted to the situation. This will contribute to maintaining the health and lives of both humans and animals.

SLOVENIJA PRIDOBILA STATUS DRŽAVE PROSTE STEKLINE

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Uvod: Ob koncu šestdesetih let je Baer (1971) v Švici opravil prvi uspešen poskus oralnega cepljenja lisic. Začetki cepljenja lisic v Sloveniji segajo v leto 1988. Sistematično cepljenje lisic smo v Sloveniji uvedli leta 1995. Cepivo se nahaja v lomljivi ampuli, ta pa je oblečena s plastjo kostno-mesne moke in maščobe. Cepivo polagamo z letali dvakrat v letu. Ob odvzemu pride cepni, atenuiran virus stekline v kontakt s sluznico, in na ta način se žival imunizira. Uspešnost cepljenja se preverja tudi v laboratoriju.

Metode: Na prisotnost virusa stekline smo vsako leto preiskali vsaj 8 lisic na 100 km². V rezini zob uplenjene lisice smo določali prisotnost biomarkerja, v telesnih tekočinah pa prisotnost specifičnih protiteles. Iz vzorcev pozitivnih na stekline smo ekstrahirali virusno RNA, opravili genotipizacijo in določili ali gre za naravni ali cepilni virus.

Rezultati: V letu 1995, pred pričetkom splošne vakcinacije lisic smo ugotovili 1089 steklih živali. V naslednjih letih je število pozitivnih primerov drastično upadlo. Vse do leta 2011, ko je tudi sosednja Hrvaška pričela s cepljenjem lisic, smo v obmejnem območju vsako leto registrirali pozitivne primere. Zadnji primer stekline, povzročen z divjim virusom, smo ugotovili v letu 2013, leto pozneje pa še primer stekle kune, vendar se je izkazalo, da je bolezen povzročil cepilni virus.

Zaključek: Podpora laboratorija v programu izkoreninjanja stekline je ključnega pomena pri odkrivanju posameznih žarišč bolezni kakor tudi pri preverjanju uspešnosti cepljenja in imunske zaščite tarčne populacije živali. Potrebno je vzpostaviti kakovosten sistem odkrivanja morebitnih novih vnosov bolezni v državo.

SLOVENIA ACQUIRED THE STATUS OF A COUNTRY FREE OF RABIES

Purpose: The first experimentally vaccination of foxes was carried out in Switzerland in the end of the sixties. In Slovenia the first vaccination of foxes was introduced in 1988 but since 1995 it was provided systematically twice per year. The vaccine is in plastic ampule, which is covered with a layer of bone meal and fats. The baits had been dropped by aircrafts twice a year. When withdrawal of the ampule occurs, the attenuated rabies virus is in contact with the mucous membranes, and in this way the animal is immunized. The success of vaccination has also verified in the laboratory.

Methods: The presence of rabies virus was investigated every year in at least 8 foxes per 100 km². The teeth slices of foxes were tested for the presence of biomarkers and thoracic fluids were tested for specific antibodies against rabies. The rabies positive samples were additionally tested: virus RNA was extracted and genotyping and differentiation between wild and vaccine strain was performed

Results: In 1995, before vaccination of foxes was carried out, 1089 samples were rabies positive. In the following years, the number of positive cases decreased drastically. Until 2011, when the neighboring Croatia launched vaccination of foxes, near border area a small number of positive cases have been detected every year up to 2013. The last case of rabies caused by wild virus strain was found in 2013 and a year later the rabid marten (*Martes martes*) was detected, but its disease was caused by vaccine virus strain.

Conclusion: The support of diagnostic laboratory in rabies eradication program is essential in identifying the individual foci of the disease as well as in verifying the performance of vaccination and immunity of the target population of the animals. It is necessary to establish a quality system of detection of potential new entries of disease in the country.

EPIDEMIOLOŠKO SPREMLJANJE DERMATOFITIZ V SLOVENIJI

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Dermatofitoze so kožne nalezljive bolezni, ki jih povzročajo glive (dermatofiti) iz rodov *Microsporum*, *Trichophyton* in *Epidermophyton*. *Microsporum* in *Trichophyton* povzročata bolezen pri človeku in pri živalih, medtem ko *E. floccosum* (edini predstavnik rodu *Epidermophyton*, ki povzroča bolezen) običajno prizadene samo ljudi. Na podlagi vseh prijavljenih primerov dermatofitoz v Sloveniji smo ocenili njihovo prevalenco med 2010 in 2015. V skladu s *Pravilnikom o prijavi nalezljivih bolezni in posebnih ukrepih za njihovo preprečevanje in obvladovanje (Ur. L RS št 16/99)* dermatofitoze uvrščamo v drugo skupino nalezljivih bolezni, ki jih je potrebno prijaviti v treh dneh od postavitve diagnoze. Analizirali smo vse prijavljene primere dermatofitoz v obdobju 2010 – 2015.

Incidenca dermatofitoz na 100 000 prebivalcev je naraščala od 155,2/100 000 v letu 2010 do 316,3/100 000 v letu 2015. Bolezen se je najpogosteje pojavljala pri otrocih, starih od 5 do 14 let in odraslih od 45 do 64 let. Po mestu kožne spremembe so bile na prvem mestu noge, sledil je trup, lasišče oziroma brada ter roke oziroma dlani. Pri otrocih so bile kožne spremembe najbolj pogoste na lasišču, sledil je trup in stopala ter roke oziroma dlani. Delež laboratorijsko potrjenih povzročiteljev dermatofitoz ostaja nizek in je bil v obdobju od 2010 do 2015 v povprečju 4,3% (razpon: 3–5,7%). Med opredeljenimi dermatofitozami sta prevladovala *Trichophyton spp.* (54,6%) in *Microsporum spp.* (46,7%). V letih 2014 in 2015 je med opredeljenimi povzročitelji prevladoval *Trichophyton spp.* (58–69%), v letih 2012 in 2013 pa je bilo največ prijavljenih dermatofitoz zaradi okužbe z *Microsporum spp.* (64,8–66,7%).

V tem obdobju sta bila na NIJZ prijavljena dva izbruha okužbe z *M. canis* v Ljubljanski regiji. Eden izmed izbruhov je bil avgusta 2000, ko se je okužilo 21 oseb, starih 5–39 let, po plavanju v javnem bazenu v Ljubljani ter so bile 4 osebe hospitalizirane. Drugi izbruh je bil novembra 2012 v dveh osnovnih šolah v manjšem kraju v severo-vzhodnem delu ljubljanske regije (11 600 prebivalcev). Izbruh je prizadel 12 učenk in je trajal 48 dni. Vse okužene učenke so v celoti okrevale. Verjeten vir okužbe za primarne primere je bila potepuška mlada mačka. Najbolj verjeten vir okužbe za sekundarne primere pa je bil stik z okuženim otrokom v času skupne športne aktivnosti.

V zadnjih petih letih je incidenca dermatofitoz strmo naraščala. Za boljše razumevanje oziroma lažje sledenje izvora okužbe bi potrebovali več laboratorijsko potrjenih okužb, ker je verjetno, da se poleg *Microsporum spp.* na ljudi prenašajo tudi drugi dermatofiti, ki jih najdemo pri živalih.

SURVEILLANCE OF DERMATOPHYTOSES IN SLOVENIA

Dermatophytoses are skin infectious diseases caused by fungi (dermatophytes) in the genera *Microsporum*, *Trichophyton* in *Epidermophyton*. Members of *Microsporum* and *Trichophyton* cause illness in both humans and animals. *E. floccosum* is the only species of *Epidermophyton* known to cause disease, and it usually affects only people. In this report, we assessed the prevalence of all notified dermatophytes in Slovenia during the period 2000 – 2015.

In accordance with *the Rules on Reporting Communicable Diseases and special Measures (Official Gazette of the Republic of Slovenia No. 16/99)* dermatophytoses belong to the second group of notifiable communicable diseases and have to be reported within three days after the diagnosis to the National Institute of Public Health (NIJZ). We analyzed all the reported cases of dermatophytes between 2000 and 2015.

The incidence per 100 000 inhabitants increased from 3103 (155,2/100 000) in 2010 to 6326 (316,3/100 000) in 2015, respectively. The disease most frequently affected children from 5 to 14 years and adults from 55 to 64 years. Skin changes appeared most frequently on legs, followed by trunk, scalp or chin and hands or palms, respectively. In children, skin lesions were sorted slightly differently, as they appear most commonly on scalp, followed by trunk and legs. The proportion of laboratory confirmed agents remained low and it was on average 4.3% (range: 3–5,7%) in the observed period.

During that period, two *M. canis* outbreaks were reported to the NIJZ. One reported outbreak occurred in August 2000, when 21 individuals aged 5–39 years were affected after swimming in a public swimming pool in Ljubljana and four cases required hospitalization. The second outbreak occurred in November 2012 in two elementary school in the north–eastern part of the Ljubljana region (population 11 600). The outbreak affected 12 pupils and lasted 48 days. All infected pupils made a full recovery. The investigation suggested that contact with an adopted stray kitten was the most likely source of infection for primary cases. However, the most probable source of infection for secondary cases was contact with the infected child during joint sports activities.

Dermatophytoses remain significant and frequently reported zoonosis. To better understand and trace the source of infection we would need more laboratory–confirmed infections, since it is likely that in addition to *Microsporum spp.* other dermatophytes found in animals are transmitted to humans as well.

ŽIVALSKÉ DERMATOFITÓZE NEKOČ IN DANES

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Uvod: Dermatofitoze so najpomembnejše glivične okužbe domačih živali, ki se v določenih okoliščinah lahko prenašajo tudi na ljudi, zato jih prištevamo med najpomembnejše zoonoze. Povzročitelje s skupnim izrazom imenujemo dermatofiti in so posebna skupina sorodnih gliv, ki pripadajo rodovom *Microsporum*, *Trichophyton* in *Epidermophyton*. Psi in mačke se najpogosteje okužijo z dermatofiti iz zoofilne skupine, predvsem s sevi vrst *M. canis* in *T. mentagrophytes*. Okužbe se pri psih običajno pojavljajo v tipični obliki, mačke in kunci pa pogosto (navadno po preboleli bolezni) ostanejo le asimptomatski prenašalci in predstavljajo največjo nevarnost za okužbo drugih živali in ljudi.

Metode in rezultati: V desetletnem obdobju (od julija 2006 do junija 2016) smo na Inštitutu za mikrobiologijo in parazitologijo Veterinarske fakultete (IMP VF) z gojiščno preiskavo pregledali skupno 9809 vzorcev dlake različnih vrst živali. Večina vzorcev je bila od bolnih živalih ali pa so bili poslani zaradi kontrole po zdravljenju. Številni vzorci so bili pregledani tudi zaradi pojava ali suma bolezni pri ljudeh, ki živijo skupaj z domačimi živalmi in lahko pomenijo potencialni vir okužbe.

Med pregledanimi vzorci so bili 1603 (16,3%) pozitivni na dematofite, izolati pa so pripadali 10 različnim vrstam. V rodu *Microsporum* je bilo ugotovljenih 5 različnih vrst (*M. canis*, *M. gypseum*, *M. persicolor*, *M. nanum* in *Microsporum* sp.) in prav tako v rodu *Trichophyton* (*T. mentagrophytes*, *T. erinacej*, *T. verrucosum*, *T. gallinae*, in *T. ajelloi*). Podatki se nanašajo izključno na rezultate gojiščnih preiskav vzorcev, ki so bili poslani na IMP VF in ne odražajo dejanskega stanja v Sloveniji.

Zaključek: Število preiskav živalskih vzorcev je po letu 2007 začelo naglo naraščati in je v obdobju 2009 do 2012 presegalo tisoč vzorcev letno. *M. canis* je še vedno najpogosteje izolirana dermatofitna vrsta, a ne več tako prevladujoča, kot v preteklosti. V posameznih letih je *T. mentagrophytes* predstavljal že skoraj tretjino vseh izolatov. Rezultati kažejo tudi nekatere posebnosti, ki jih v preteklosti nismo zaznali. Pogosteje se pojavljajo določeni dermatofiti pri živalih, ki sicer niso njihovi primarni gostitelji, npr. *T. mentagrophytes* pri psih in mačkah, in *M. canis* pri kuncih in glodalcih. Izjemoma sta pri eni živali lahko izolirana celo po dva povzročitelja hkrati. Pomemben razlog so verjetno potepuške mačke in pojav trgovin

za male živali, kjer prodajajo živali iz zelo različnih rej. Okužene živali pogosto ne kažejo znakov bolezni in okužba se lahko močno razširi, preden postane klinično prepoznavna. Pojav neobičajnih vrst dermatofitov, (npr. *T. gallinae* pri pticah, *T. erinacei* pri ježih in budrah, *Microsporum persicolor* pri psih), ki jih v Sloveniji v preteklosti nismo poznali, pa je verjetno posledica uvoza živali brez ustreznega veterinarskega nadzora.

ANIMAL DERMATOPHYTOSES IN THE PAST AND TODAY

Background: Dermatophytoses are the most important fungal infections of domestic animals which in certain circumstances can also be transmitted to humans therefore are belong to the most important zoonoses. Dermatophytes are a special group of related fungi belonging to the genera *Microsporum*, *Trichophyton* and *Epidermophyton*. Dogs and cats are most commonly infected with zoophilic dermatophytes, especially with *M. canis* and *T. mentagrophytes*. Infections in dogs usually appear clinically, but cats and rabbits are often (usually after recovering) remain asymptomatic carriers and represent the greatest risk of infection for other animals and humans.

Methods and results: In the ten-year period (from July 2006 to June 2016) a total of 9809 animal samples were examined at the Institute of Microbiology and Parasitology of Veterinary Faculty (VF IMP). Most of the samples were sent from the animals with skin changes or as a control samples after treatment. Additional samples were also examined due to suspicion of the disease among people who live with animals and which represent a potential source of infection.

Among the samples examined 1603 (16.3%) were positive to dematophytes and isolates belonged to 10 different species. Among genus *Microsporum* five different species were identified (*M. canis*, *M. gypseum*, *M. persicolor*, *M. nanum* and *Microsporum sp.*) and another five species among the genus *Trichophyton* (*T. mentagrophytes*, *T. erinacei*, *T. verrucosum*, *T. gallinae* and *T. ajelloi*). The data relate only with the results of samples sent to the IMP VF and are not necessarily indicative for the actual situation in Slovenia.

Conclusions: After 2007 investigations of animal samples began to rise rapidly and in the period 2009 to 2012 exceeded the thousands of samples annually. *M. canis* is still the most frequently isolated dermatophyte species, but not so prevailing as in the past. In certain years, *T. mentagrophytes* accounted for almost a third of all isolates. Additionally, the results also show some specialty, which has not been detected in the past. For example, isolation of dermatophytes from certain animal species, which are not their primary hosts (*T. mentagrophytes* in dogs and cats, and *M. canis* in rabbits and rodents) occurred frequently. Exceptionally, even two different dermatophyte species were isolated simultaneously from a single sample. An important reason are probably stray cats and the emergence of numerous pet stores, selling animals from different households. Infected animals are often without any clinical signs and infection can be widely extended, before they becomes recognizable clinically. The emergence of unusual dermatophyte species (eg. *T. gallinae* in birds, *T. erinacei*

in hedgehogs and guinea pigs, *M. persicolor* in dogs), which were not present in Slovenia in the past, are probably due to the importation of animals without proper veterinary control.

AVIARNA INFLUENCA - PREGLED STANJA V SLOVENIJI V ZADNJEM DESETLETJU

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Uvod: Aviarna influenca (AI) je kužna, virusna bolezen ptic. Na osnovi patogenosti virusa za perutnino so virusi AI razvrščeni v nizko patogene (LPAI) in visoko patogene viruse (HPAI), med katerimi sta še vedno najpomebnejša podtipa H5 in H7. Države članice EU izvajajo v skladu z Direktivo 2005/94/ES obvezne programe nadzora predvsem z namenom zgodnjega odkrivanja podtipov LPAI H5 in H7.

Metode: V okviru predpisanega programa nadzora AI v Sloveniji izvajamo serološki monitoring pri perutnini in virološki monitoring pri prostoživečih pticah. Poleg predpisanega monitoringa aviarno influenco izključujemo v vseh primerih, ko je za to prisotna indikacija, npr. višji pogin. Za detekcijo specifičnih protiteles proti podtipoma H5 in H7 uporabljamo test inhibicije hemaglutinacije (HIT), za virološko detekcijo virusov AI pa molekularno metodo obratnega prepisovanja in verižne reakcije s polimerazo (RT-PCR). Obe metodi sta priporočeni od Referenčnega laboratorija EU za AI.

Rezultati: V desetih letih smo v okviru predpisanega monitoringa pregledali 25.207 serumov perutnine in 3.210 prostoživečih ptic, poleg tega smo diferencialno diagnostično pregledali 1.079 ptic. S serološkimi preiskavami smo samo v eni jati rac, vzorčeni v letu 2013, potrdili protitelesa proti podtipu H5, vendar virusa AI nismo dokazali. V letu 2006 smo imeli pojav HPAI povzročene s podtipom H5N1. Virus smo potrdili pri 48 prostoživečih pticah. LPAI viruse podtipa H5 smo potrdili v letih 2009 in 2011, LPAI viruse podtipa H7 pa v letu 2009.

Zaključek: Kljub številnim pojavom LPAI in HPAI v okoliških državah smo v zadnjem desetletju imeli primere HPAI le v letu 2006 in LPAI v letih 2009 in 2011, vsi so bili potrjeni pri prostoživečih pticah.

Vzrok za ugodno epizootiološko situacijo v Sloveniji je najverjetneje v manjši populaciji vodne perutnine in vodnih ptic v Sloveniji v primerjavi z ostalimi državami.

Opomba: Rezultati so bili pridobljeni v okviru programa nadzora, ki se izvaja na podlagi Odredbe o izvajanju sistematičnega spremljanja stanja bolezni in cepljenj živali in je financiran s strani Uprave za varno hrano, veterinarstvo in varstvo rastlin.

AVIAN INFLUENZA - SITUATION IN SLOVENIA IN THE LAST DECADE

Background: Avian influenza is an infectious viral disease of birds. Based on the pathogenicity of the virus in poultry, AI viruses are classified into low pathogenic (LPAI) and highly pathogenic virus (HPAI), among which the most important are subtypes H5 and H7. With the aim of an early detection of LPAI H5 and H7 subtypes in poultry and wild birds Directive 2005/94/EC provides the compulsory surveillance programs for EU member states.

Methods: Serological surveillance in poultry and virological surveillance in wild birds were performed. Besides the surveillance program, avian influenza viruses were excluded in all the cases where an indication, such as higher mortality, was present. For the detection of specific antibodies against the H5 and H7 subtypes, the haemagglutination inhibition test (HIT) was used, and for virological detection of AI viruses the molecular method of reverse transcription and polymerase chain reaction (RT-PCR) was used; both methods are recommended by the EU reference laboratory for AI.

Results: All together 25.207 poultry sera and 3.210 wild birds were tested within surveillance program in the last decade. In addition, as a part of the differential diagnostic, 1.079 birds were tested by RT-PCR. In the frame of serological surveillance only one flock of ducks sampled in 2013, had antibodies against H5 subtype, but the AI virus subtype H5 was not detected. In 2006 there was an outbreak of HPAI subtype H5N1, virus was confirmed in 48 wild birds. LPAI H5 subtype was confirmed in 2009 and 2011, while LPAI subtype H7 was detected in 2009.

Conclusions: Despite the increasing number of outbreaks of LPAI and HPAI in the surrounding countries in the last decade, only one outbreak of HPAI and two cases of LPAI were confirmed in wild birds. The cause of satisfactory epidemiological situation in Slovenia is probably in small populations of domestic and wild waterfowl found in Slovenia in comparison with other countries.

Note: The results were obtained in the frame of the surveillance programme, which is carried out on the basis of the Order on the systematic monitoring of animal health status, disease eradication programmes and vaccination and is funded by the Administration for food safety, veterinary sector and plant protection.

ODPORNOST BAKTERIJ PROTI ANTIBIOTIKOM PRI LJUDEH IN ŽIVALIH - KAJ VEMO IN KAJ BI ŽELELI VEDETI?

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Uvod: Odpornost bakterij proti antibiotikom prizadene tako ljudi kot živali in globalno narašča. Z molekularnimi metodami so dokazali, da se podobni tipi odpornosti pojavljajo pri bakterijah človeškega, živalskega in okoljskega izvora in da je možen prenos takih bakterij ali genov za odpornost v prehranski verigi. Raba antibiotikov povečuje selekcijski pritisk, ki omogoča širjenje bolj odpornih sevov.

Rezultati: V zadnjem desetletju je pri ljudeh prišlo do naglega porasta števila okužb z enterobakterijami, ki izločajo encime betalaktamaze z razširjenim spektrom delovanja (ESBL). Pogosto so odporne tudi proti drugim skupinam antibiotikov. Razširili so se kloni, ki so hkrati odporni in virulentni. *Escherichia coli* z ESBL je pogosto prisotna pri rejnih živalih, zlasti pri perutnini oziroma v piščančjem mesu, kar je bilo ugotovljeno tudi v Sloveniji. Povezava med človeškimi in živalskimi izolati je zapletena, spremljanje načina širjenja odpornih bakterij pa je možno le z molekularnimi metodami. Verjetno so pri človeku deleži *E. coli* z ESBL, ki izvirajo iz živali, od države do države različni.

Največja grožnja uspešnemu zdravljenju z antibiotiki so proti karbapenemom odporne enterobakterije, ki izločajo karbapenemaze (CRE-CPE). Običajno so odporne proti skoraj vsem varnim antibiotikom, ki se uporabljajo za zdravljenje ljudi. Pogoste so v Aziji, Afriki in v nekaterih evropskih državah. V Sloveniji bolnikov s CRE-CPE ni bilo veliko, a je bil prepoznana vsaj en izbruh in stanje se lahko hitro poslabša.

Podatkov o CRE-CPE pri živalih ni veliko, zaskrbljujoči so podatki iz Egipta, kjer so CRE-CPE našli v mesu v prodaji, pri govedu in perutnini, v pitni vodi in pri delavcih na perutninski farmi. V Sloveniji takih primerov še nismo zabeležili. Okužbe s CRE-CPE je pogosto treba zdraviti s kolistinom, a so že dokazali gen za odpornost proti kolistinu na plazmidu bakterij, izoliranih iz živali in ljudi.

Pri ljudeh se karbapenemaze pojavljajo tudi pri izolatih *Pseudomonas aeruginosa* in *Acinetobacter baumannii*. Osamili so jih tudi pri živalih. Pri salmonelah je porasla odpornost proti ciprofloksacinu. Pri kampilobaktru je odpornost proti ciprofloksacinu velika, a stabilna.

Novost zadnjih let so proti metilicinu odporni izolati *S. aureus* pri rejnih živalih (LA-MRSA), s katerimi so kolonizirani zlasti prašiči, prenašajo pa se tudi na človeka. Primeri LA-MRSA so ugotovljeni v celi državi, pogostejši pa so v vzhodni Sloveniji. Proti vankomicinu odporni *Enterococcus faecium* (VRE) v Sloveniji ni pogost, a pojavnost pri nas in drugod v Evropi narašča.

Zaključek: Pojavljanje in globalno širjenje odpornih bakterij otežuje zdravljenje okužb pri ljudeh in živalih. Izračunali so, da bo število smrti zaradi odpornosti leta 2050 14-krat večje kot je danes, če ne bomo uspešno ukrepali. V razumevanju odpornosti obstajajo velike vrzeli, a vemo dovolj, da na številnih področjih lahko ukrepamo.

BACTERIAL ANTIBIOTIC-RESISTANCE IN HUMANS AND ANIMALS - WHAT DO WE KNOW AND WHAT WOULD WE LIKE TO KNOW?

Background: The presence of antibiotic-resistant bacteria is growing globally and affects both humans and animals. With molecular methods it was demonstrated that similar types of resistance occur in bacteria from human, animal and environmental origin and that transfer of such bacteria or genes for resistance is possible in the food chain. The use of antibiotics increases selection pressure which allows the spread of more resistant strains.

Results: In the past decade there has been a rapid increase in the number of infections with *Enterobacteriaceae* which produces extended-spectrum beta-lactamases (ESBL) in humans. They are often resistant to other groups of antibiotics as well. Clones that are both resistant and virulent have been expanded. *Escherichia coli* with ESBL is frequently present in farm animals, especially in poultry and chicken meat, which is also found in Slovenia. The connection between human and animal isolates is complex and monitoring of the mode of spread of resistant bacteria is possible only by molecular methods. The proportions of *E. coli* with ESBL in humans that derived from animals are probably different from country to country.

The biggest threat to successful treatment with antibiotics are carbapenemase-producing *Enterobacteriaceae* (CRE-CPE), which are resistant to almost all safe antibiotics used in medical care. They are frequent in Asia, Africa and some European countries. In Slovenia there have been few patients with CRE-CPE, although at least one outbreak has been detected and the situation could quickly worsen.

There is little data on CRE-CPE in animals, but worrying data comes from Egypt, where CRE-CPE has been found in retail meat, cattle, poultry, drinking water and poultry farm workers. In Slovenia such cases have yet to be recorded. Infections with CRE-CPE are often treated with colistin, but the gene for colistin resistance has already been proven on plasmids in animals and humans.

Carbapenemases also occur in human and animal isolates of *Pseudomonas aeruginosa* and *Acinetobacter baumannii*. Ciprofloxacin resistance in salmonella is increasing. *Campylobacter* is frequently resistant to ciprofloxacin, but the resistance is stable.

In recent years, methicillin resistant isolates of *Staphylococcus aureus* have been found in farm animals (livestock associated – LA-MRSA), especially in pigs, and can be transferred and infect humans as well. LA-MRSA cases were detected throughout the country, they are more common in eastern part of Slovenia.

Vancomycin resistant *Enterococcus faecium* (VRE) is uncommon in Slovenia, but prevalence is increasing, similarly elsewhere in Europe.

Conclusions: The global rise and spread of resistant bacteria is already putting a strain on successful treatment of humans and animals. It has been estimated that in 2050 mortality due to antibiotic resistance will be 14 times higher than it is today, if we do not act successfully. Resistance is not fully understood, but we know enough, that we can make changes in numerous fields.

AKVARIJSKE RIBICE: ROKE PROČI!

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Uvod: Akvarijske ribice in akvariji so vir netuberkuloznih (okoljskih, atipičnih) mikobakterij, ki lahko ogrožajo tudi zdravje ljudi. Namen prispevka je opozoriti na vlogo netuberkuloznih mikobakterij, ki je sicer v klinični mikrobiologiji podcenjena, saj pogosto ostanejo neodkrite oziroma napačno identificirane, posledično pa je ozaveščenost o njihovem zoonotskem potencialu premajhna.

Metode in rezultati: Akvarijske ribice, ki so v prodaji v Sloveniji, smo prvič preučevali v obdobju med letoma 2001 in 2004, ko smo s klasičnimi in molekularnimi metodami pregledali 35 ribic različnih vrst, med katerimi jih je bilo 82,9% pozitivnih na mikobakterije. Najpogosteje je bila ugotovljena vrsta *Mycobacterium (M.) fortuitum* (24,1%), vrsta *M. marinum*, ki najpogosteje povzroča kožne spremembe pri ljudeh, pa je bila izolirana iz 20,7 % ribic. V zadnji raziskavi, ki smo jo izvedli v obdobju 2009-2011, smo preučili 107 ribic in prisotnost mikobakterij potrdili pri 79,4 % ribic. Spet je prevladovala vrsta *M. fortuitum* (60,9 %), vrsto *M. marinum* pa smo ugotovili pri 10,6 % pozitivnih ribic. Bakterija *M. marinum* je bila iz kužnin človeka v obdobju 2000–2015 izolirana pri 14 slovenskih bolnikih. V vseh primerih je šlo za klinično pomemben izolat, ki je povzročil kožne spremembe na okončinah, ki jih ni bilo moč pozdraviti z običajnimi protimikrobnimi sredstvi.

Zaključek: Rezultati naših raziskav kažejo na to, da so pri veliki večini akvarijskih ribic, ki se prodajajo v Sloveniji, prisotne mikobakterije, med katerimi prevladujejo za ljudi potencialno patogene vrste. Pri tem je zlasti pomemben relativno visok delež vrste *M. marinum*, ki je najpomembnejša povzročiteljica kožne mikobakterioze pri ljudeh. Zato je velikega pomena ozaveščanje tistih, ki se poklicno ali ljubiteljsko ukvarjajo predvsem z akvarijskimi ribami, ter zdravnikov, ki naj v primeru trdovratnih kožnih sprememb pomislijo tudi na mikobakterije, saj bi lahko s pravočasno diagnozo in zdravljenjem preprečili kronični potek bolezni. Najpomembnejši korak pri zmanjševanju možnosti okužb je, da si pri rokovanju z ribami obvezno nadenemo vodotesne rokavice. S tako preprostim ukrepom si namreč lahko prihranimo morebitno večmesečno zdravljenje s protimikrobnimi zdravili.

AQUARIUM FISH: KEEP YOUR HANDS OFF!

Background: Ornamental fish and aquaria are a source of various nontuberculous (environmental, atypical) mycobacteria, which may pose a risk to human health. The purpose of this work is to draw attention to the role of nontuberculous mycobacteria, which is largely underestimated as they often remain unrecognized and misidentified in clinical settings. Accordingly, the awareness of their zoonotic potential is generally poor.

Methods and results: Aquarium fish sold in Slovenia were first screened for the presence of mycobacteria in the period from 2001 to 2004, when 35 fish of several species were investigated with classical and molecular methods and 82.9% were found to be positive. The predominant mycobacterial species identified was *Mycobacterium (M.) fortuitum* (24.1%), while *M. marinum*, a well-known human pathogen causing skin lesions, was detected in 20.7% fish. The latest survey, conducted between 2009 and 2011 on 107 fish, revealed that mycobacteria were recovered from 79.4% of sampled fish. Again, *M. fortuitum* (60.9%) was found to be the most prevalent; *M. marinum* was identified in 10.6% of the positive fish. In humans, *M. marinum* has been reported to be isolated from 14 patients between 2000 and 2015; all isolates were of clinical significance, inducing skin lesions on the extremities of the patients which failed to respond to treatment with common antimicrobials.

Conclusions: The results of our studies indicate a high level of ornamental fish contamination with environmental mycobacteria potentially pathogenic for humans. A relatively high proportion of *M. marinum*, the most important causative agent of skin mycobacteriosis in humans, calls for attention. Microbiological and clinical communities should be sensitized to the role of nontuberculous mycobacteria in infections associated with exposure to aquarium fish. In the case of skin lesions, clinicians should consider mycobacteria as a possible causative agent in order to implement appropriate treatment early in the course of infection to prevent chronic manifestations of the disease. When handling the fish and aquarium contents, the use of waterproof gloves should become a simple mandatory measure which can prevent possible long-term treatment with antimicrobials.

SODELUJOČE INŠTITUCIJE

 <p>Nacionalni inštitut za javno zdravje</p>	<p>NACIONALNI INŠTITUT ZA JAVNO ZDRAVJE</p>	<p>Center za nalezljive bolezni; OE Novo mesto, Področje nalezljivih bolezni; OE Maribor, Področje nalezljivih bolezni.</p>
 <p>NACIONALNI LABORATORIJ ZA ZDRAVJE, OKOLJE IN HRANO</p>	<p>NACIONALNI LABORATORIJ ZA ZDRAVJE, OKOLJE IN HRANO</p>	
<p>Univerza v Ljubljani Veterinarska fakulteta</p> 	<p>UNIVERZA V LJUBLJANI, VETERINARSKA FAKULTETA</p>	<p>Inštitut za varno hrano, krmo in okolje</p>
 <p>bolnišnica GOLNIK KLINIČNI ODDELEK ZA PLJUČNE BOLEZNI IN ALERGIJO</p>	<p>BOLNIŠNICA GOLNIK, UNIVERZITETNA KLINIKA ZA PLJUČNE BOLEZNI IN ALERGIJO</p>	<p>Laboratorij za mikrobakterije</p>
<p>REPUBLIKA SLOVENIJA MINISTRSTVO ZA KMETIJSTVO, GOZDARSTVO IN PREHRANO</p> <p>UPRAVA RS ZA VARNO HRANO, VETERINARSTVO IN VARSTVO RASTLIN</p>	<p>REPUBLIKA SLOVENIJA, MINISTRSTVO ZA KMETIJSTVO, GOZDARSTVO IN PREHRANO, UPRAVA REPUBLIKE SLOVENIJE ZA VARNO HRANO, VETERINARSTVO IN VARSTVO RASTLIN</p>	

Z namenom, da strokovnjaki predstavijo novosti in izsledke raziskav in da se oblikujejo predlogi za skupno doseganje ciljev, ki so poudarjeni v sloganu „One Health“ sta Nacionalni inštitut za javno zdravje in Veterinarska fakulteta Univerze v Ljubljani ob svetovnem dnevu “Eno zdravje” organizirala strokovno posvetovanje.

Posvet je potekal 3. novembra 2016 v Veliki predavalnici na Nacionalnem inštitutu za javno zdravje, Zaloška 29, 1000 Ljubljana. Na posvetu je bilo 120 udeležencev.

Aktivno so sodelovali strokovnjaki s področja nalezljivih bolezni z Nacionalnega inštituta za javno zdravje (NIJZ) in sicer s Centra za nalezljive bolezni ter OE Novo mesto in OE Maribor, strokovnjaki z Nacionalnega laboratorija za zdravje, okolje in hrano (NLZOH), z Veterinarske fakultete Univerze v Ljubljani, Bolnišnice Golnik Univerzitetne klinike za pljučne bolezni in alergijo in Uprave Republike Slovenije za varno hrano, veterinarstvo in varstvo rastlin (UVHVVR).



PROGRAM

8.00 - 9.00	REGISTRACIJA
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UVODNI NAGOVOR

9.00 - 9.30	prim.izr. prof. dr. Alenka Kraigher, predstojnica Centra za nalezljive bolezni, NIJZ prof. dr. Andrej Kirbiš, dekan, Univerza v Ljubljani, Veterinarska fakulteta v Ljubljani
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MEDSEBOJNO OBVEŠČANJE O ZOOZOZAH

Moderatorica: mag. Eva Grilc

TERMIN	TEMA	PREDAVATELJ
9.30 - 9.45	Spremljanje pojavljanja zoonoz in obveščanje med UVHVVR in NIJZ	Špela Vidovič Zoran Simonovič
9.45 - 10.00	Bolezni živali in zoonoze - obveščanje, poročanje in sodelovanje	Jedrt Maurer Wernig
10.00 - 10.30	Razprava	

NALEZLJIVE BOLEZNI, KI SE PRENAŠAJO S HRANO IN VODO

Moderator: dr. Igor Gruntar

TERMIN	TEMA	PREDAVATELJ
10.30 - 10.45	Kampilobaktrski gastroenterokolitis. Porajajoča se zoonoza?	mag. Eva Grilc Maja Praprotnik
10.45 - 11.00	Kampilobaktri – od živali preko hrane do ljudi	asist. dr. Stanka Vadnjal dr. Majda Biasizzo dr. Urška Jamnikar Ciglencečki dr. Urška Henigman
10.45 - 11.00	Sistem spremljanja Creutzfeldt - Jakobove bolezni in epidemiološka situacija v Sloveniji	Nuška Čakš Jager Mateja Blaško Markič prim.izr. prof. dr. Alenka Kraigher
11.00 - 11.15	Sistem spremljanja živalskih TSE in epizootiološka situacija	mag. Ivan Ambrožič prof. dr. Polona Juntos
11.15 - 11.45	Razprava	

VEKTORSKE NALEZLJIVE BOLEZNI

Moderatorica: izr. prof. dr. Maja Sočan

TERMIN	TEMA	PREDAVATELJ
11.45 - 12.00	Pojav in razširjenost virusa Zahodnega Nila - spremljanje in obvladovanje	izr. prof. dr. Maja Sočan
12.00 - 12.15	Vektorske nalezljive zoonoze	prof. dr. Tadej Malovrh prof. dr. Peter Hostnik
12.15 - 12.30	Razprava	
12.30 - 13.00	ODMOR	

STEKLINA		
Moderator: prof. dr. Peter Hostnik		
<i>TERMIN</i>	<i>TEMA</i>	<i>PREDAVATELJ</i>
13.00 - 13.15	Dejavnost zdravstvene službe za zaščito ljudi pred steklino	Marta Košir
13.15 - 13.30	Slovenija pridobiva status države proste stekline	prof. dr. Peter Hostnik
13.30 - 14.00	Razprava	

DERMATOFITOZE		
Moderatorica: doc. dr. Tadeja Matos		
<i>TERMIN</i>	<i>TEMA</i>	<i>PREDAVATELJ</i>
14.00 - 14.15	Epidemiološko spremljanje dermatofitoz v Sloveniji	mag. Eva Grilc dr. Maja Šubelj Saša Steiner Rihtar
14.15 - 14.30	Živalske dermatofitose nekoč in danes	doc. dr. Irena Zdovc asist. Majda Golob
14.30 - 14.45	Razprava	

AVIARNA INFLUENCA		
Moderatorica: prof. dr. Olga Zorman Rojs		
<i>TERMIN</i>	<i>TEMA</i>	<i>PREDAVATELJ</i>
14.45 - 15.00	Aviarna influenza – pregled stanja v zadnjem desetletju	asist. dr. Brigita Slavec mag. Aleksandra Hari doc. dr. Uroš Krapež prof. dr. Olga Zorman Rojs
15.00 - 15.10	Razprava	

ODPORNOST PROTI ANTIBIOTIKOM		
Moderatorica: mag. Eva Grilc		
<i>TERMIN</i>	<i>TEMA</i>	<i>PREDAVATELJ</i>
15.10 - 15.25	Odpornost bakterij proti antibiotikom pri ljudeh in živalih - kaj vemo in kaj bi želeli vedeti?	mag. Iztok Štrumbelj Jana Kolman doc. dr. Irena Zdovc asist. Majda Golob
15.25 - 15.35	Razprava	

NETUBERKULOZNE MIKOBakterIJE		
Moderatorica: mag. Eva Grilc		
<i>TERMIN</i>	<i>TEMA</i>	<i>PREDAVATELJ</i>
15.35 - 15.50	Akvarijske ribice: roke proč!	dr. Mateja Pate prof. dr. Vlasta Jenčič dr. Darja Kušar Urška Zajc dr. Manca Žolnir Dovč dr. Matjaž Ocepek

15.50 -16.00	Razprava	
16.00 -17.00	SKLEPI IN ZAKLJUČKI	Moderatorici: mag. Eva Grilc in doc. dr. Irena Zdovc

