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Сажеци научних скупова АМН СЛД
Волумен 1, број 2, 2025.

МЕЂУНАРОДНИ СИМПОЗИЈУМ ДАН ЈЕДНОГ ЗДРАВЉА 2025.

INTERNATIONAL SYMPOSIUM ONE HEALTH DAY 2025

Уредници/Editors
Марија Јевтић/Marija Jevtić
Бранислава Белић/ Branislava Belić

Академија медицинских наука
Српског лекарског друштва
Београд, 2025

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Academy of Medical Sciences
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03 November 2025.
Дом Српског лекарског друштва
Краљице Наталије 1-3
03 November 2025.
Home of the Serbian Medical Society
Kraljice Natalije 1–3

Academy of Medical Sciences
Serbian Medical Society
Belgrade, 2025

Академија медицинских наука Српског лекарског друштва
Београд, 2025.
Academy of Medical Sciences, Serbian Medical Society
Belgrade, 2025.

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Beograd, 2025
Place and year of publication
Belgrade, 2025

Предговор

Ова књига апстраката је са Међународног симпозијума Академије медицинских наука Српског лекарског друштва – Дан једног здравља 2025, научни скуп који је постао препозната традиција Академије. Континуираном организацијом овог годишњег симпозијума, Академија је створила стабилну платформу за мултидисциплинарну размену и промоцију интегрисаних приступа здравственим изазовима на релацији човек-животиња-животна средина.

Апстракти представљени у овој књизи одражавају кључне тематске стубове концепта „Једног здравља“. Прилози се баве приоритетним питањима као што су антимикробна резистенција као глобални и европски изазов јавног здравља, надзор птичјег грипа, биолошка безбедност и мултисекторски одговор, као и спровођење мера превенције и контроле инфекција у хуманој и ветеринарској медицини. Неколико радова истражује улогу хемије хране, безбедности хране и пољопривредне производње у заштити здравља и обезбеђивању еколошке одрживости, док се други фокусирају на изложеност животне средине, укључујући квалитет воде за пиће и утицај пољопривредних пракси.

Поред тога, симпозијум истиче нове и међусекторске теме, укључујући примену вештачке интелигенције и дигиталних алата у оквиру „Једног здравља“, као и значај мултидисциплинарности, комуникације, сарадње и управљања у решавању сложених здравствених ризика. Постер презентације додатно допуњују ове теме испитивањем практичних изазова у имплементацији приступа „Једног здравља“ и представљањем примењених истраживања из перспективе „Једног здравља“.

Карактеристика овог симпозијума је учешће еминентних предавача и стручњака из различитих научних области и стручних сектора. Сваке године, састанак окупља водеће националне и међународне стручњаке, осигуравајући његов снажан међународни карактер и усклађеност са савременим научним, политичким и практично оријентисаним дебатама.

Кроз ову публикацију, Академија медицинских наука потврђује своју посвећеност научној изврсности, интердисциплинарној сарадњи и превођењу знања у праксу. Остајемо посвећени наставку промоције концепта „Једног здравља“ унутар Академије, препознајући га као стратешки приоритет у потпуности усклађен са европским и глобалним здравственим оквирима и неопходан за изградњу отпорних и одрживих здравствених система.

Уредници

Марија Јевтић

Бранислава Белић

Preface

Book of Abstracts accompanies the International Symposium of the Academy of Medical Sciences of the Serbian Medical Society – One Health Day 2025, a scientific meeting that has become a recognized tradition of the Academy. Through continuous organization of this annual symposium, the Academy has created a stable platform for multidisciplinary exchange and the promotion of integrated approaches to health challenges at the human–animal–environment interface.

The abstracts presented in this volume reflect the key thematic pillars of the One Health concept. The contributions address priority issues such as antimicrobial resistance as a global and European public health challenge, avian influenza surveillance, biosecurity and multisectoral response, and the implementation of infection prevention and control measures across human and veterinary medicine. Several papers explore the role of food chemistry, food safety, and agricultural production in protecting health and ensuring environmental sustainability, while others focus on environmental exposures, including drinking water quality and the impact of agricultural practices.

In addition, the symposium highlights emerging and cross-cutting topics, including the application of artificial intelligence and digital tools within the One Health framework, as well as the importance of multidisciplinarity, communication, collaboration, and governance in addressing complex health risks. Poster presentations further complement these themes by examining practical challenges in the implementation of One Health approaches and by presenting applied research from a One Health perspective.

A defining characteristic of this symposium is the participation of eminent lecturers and experts from diverse scientific fields and professional sectors. Each year, the meeting brings together leading national and international experts, ensuring its strong international character and alignment with contemporary scientific, policy, and practice-oriented debates.

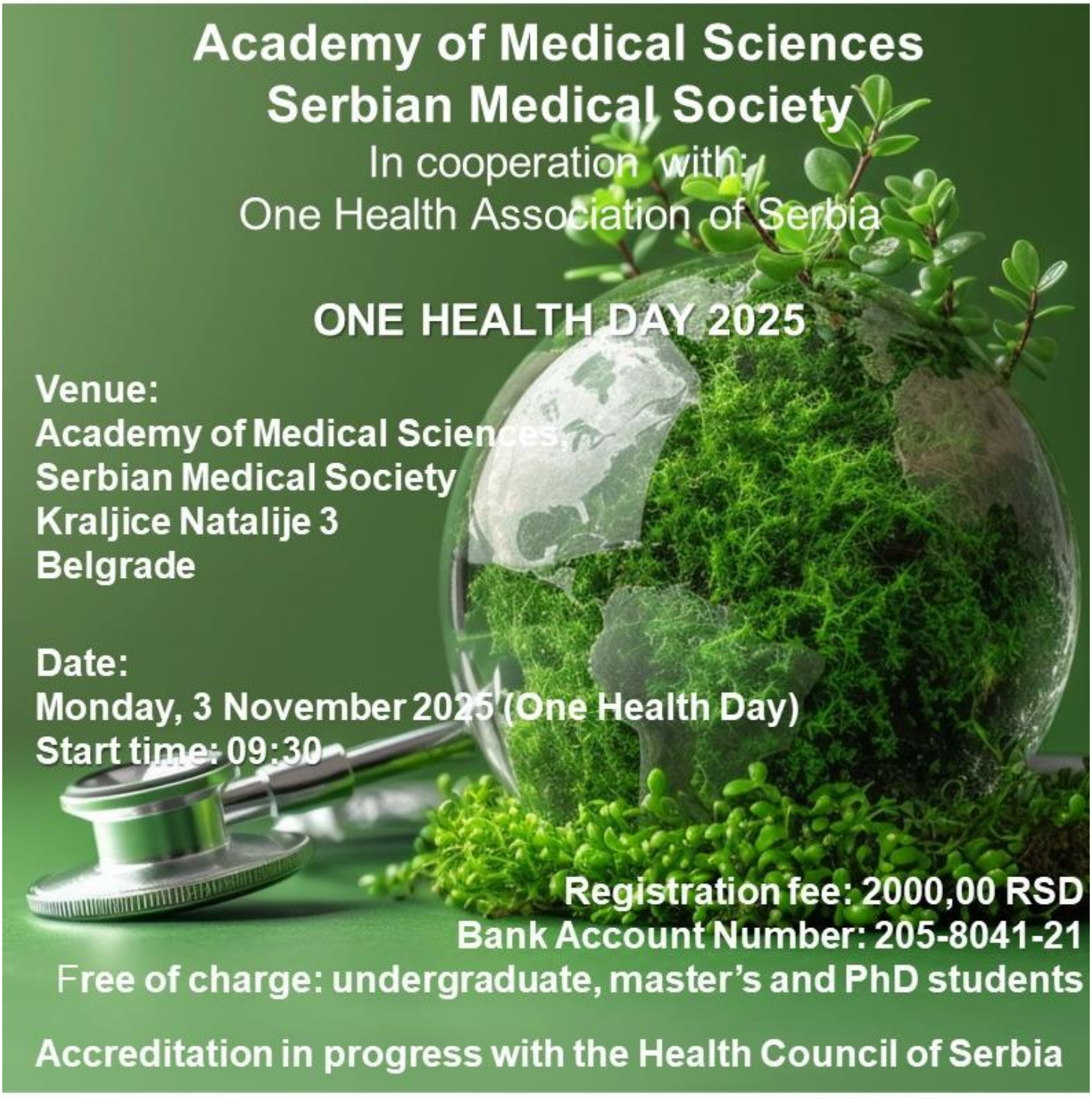
Through this publication, the Academy of Medical Sciences reaffirms its dedication to scientific excellence, interdisciplinary cooperation, and the translation of knowledge into practice. We remain committed to continuing the promotion of the One Health concept within the Academy, recognizing it as a strategic priority fully aligned with European and global health frameworks and essential for building resilient and sustainable health systems.

Editors

Marija Jevtić
Branislava Belić

International Symposium of the Academy of Medical Sciences Serbian Medical Society

ONE HEALTH DAY 2025



Academy of Medical Sciences
Serbian Medical Society

In cooperation with:
One Health Association of Serbia

ONE HEALTH DAY 2025

Venue:
Academy of Medical Sciences,
Serbian Medical Society
Kraljice Natalije 3
Belgrade

Date:
Monday, 3 November 2025 (One Health Day)
Start time: 09:30

Registration fee: 2000,00 RSD
Bank Account Number: 205-8041-21
Free of charge: undergraduate, master's and PhD students

Accreditation in progress with the Health Council of Serbia

ONLINE registration:

https://forms.gle/Se2Cw6qGRu1GC5AH7

International Symposium of the Academy of Medical Sciences Serbian Medical Society
ONE HEALTH DAY 2025

Speakers / Panelists

Dr. Martina Šrajer Gajdošik, Assistant Professor, Department of Chemistry, J. J. Strossmayer University of Osijek, Croatia

Dr. Sci. Med. Milka Sokolović, Director General, European Public Health Alliance (EPHA); Member, WHO Civil Society Commission Steering Committee, Brussels, Belgium

Dr vet med Dragomir Ivanov, PhD Researcher, Faculty of Public Health, Medical University of Varna; Bulgarian Association "One Health", Varna, Bulgaria

Prof. Nihad Fejzić, Full Professor of Veterinary Epidemiology, Animal Health Economics, and Zoonoses, Faculty of Veterinary Medicine, University of Sarajevo, Bosnia and Herzegovina

Dr. vet sci Boban Đurić, Ministry of Agriculture of the Republic of Serbia, Veterinary Directorate, Belgrade, Serbia

Prof. Dr. Dragana Latković, Faculty of Agriculture, University of Novi Sad, Department of Field and Vegetable Crops; Director, Institute of Field and Vegetable Crops, Novi Sad, Serbia

MSc Miljan Rančić, World Health Organization (WHO), Country Office Belgrade, Serbia

Prof. dr. Slavča Hristov, Faculty of Agriculture, University of Belgrade, Serbia

Prof. Dr. Branislava Belić, Full Member, Academy of Medical Sciences, Serbian Medical Society, Serbia

Prof. Dr. Marija Jevtić, Faculty of Medicine, University of Novi Sad; Institute of Public Health of Vojvodina; One Health Association of Serbia; Research Collaborator, Université Libre de Bruxelles (ULB), Full member Academy of Medical Sciences, Serbian Medical Society

ANIMAL HEALTH — HUMAN HEALTH — ENVIRONMENTAL HEALTH

International Symposium of the Academy of Medical Sciences Serbian Medical Society
ONE HEALTH DAY 2025

The Academy of Medical Sciences of the Serbian Medical Society is dedicated to the One Health concept and to promoting multidisciplinary collaboration among professionals from various fields.

We are actively engaged in strengthening professional capacities within the One Health framework, advancing knowledge, and fostering cooperation among institutions operating in the sectors of human health, veterinary medicine, biology, ecology, and related disciplines, as well as in education.

The integration of diverse disciplines and joint action form the foundation for building more resilient systems and ensuring health protection in a manner that is equitable, sustainable, and oriented toward a healthier future.

International Symposium of the Academy of Medical Sciences Serbian Medical Society ONE HEALTH DAY 2025

Scientific and Program Committee:

Federica Margheri, Executive Director, European Health Management Association (EHMA), Brussels, Belgium

Monica G. Brînzac, PhD(c), Center for Health Workforce Research and Policy, Babeș–Bolyai University, Cluj Napoca, Romania; Network Coordinator, EUPHAnxt, European Public Health Association (EUPHA)

Prof. Dr. Jože Starič, Research Associate, University of Ljubljana, Veterinary Faculty (UL-VF), Slovenia

Prof. Dr. Ljubica Đukanović, Academy of Medical Sciences, Serbian Medical Society, Serbia

Prof. Dr. Nikolina Novakov, University of Novi Sad, Faculty of Agriculture, Department of Veterinary Medicine, Serbia

International Symposium of the Academy of Medical Sciences Serbian Medical Society ONE HEALTH DAY 2025

09:00–09:30	**Registration**	
09:30–10:00	Opening remarks and welcome address	Representative of the Academy of Medical Sciences of the Serbian Medical Society
10:00	European Public Health Alliance (EPHA): The One Health as a Priority Concept	Dr. Milka Sokolović, EPHA
10:45	Avian Influenza in Serbia: Surveillance, Biosecurity and Multisectoral Response in the Context of the One Health Concept	Boban Đurić, DVM, Ministry of Agriculture, Republic of Serbia
11:30	The Role of Food Chemistry in the One Health Approach	Dr. Martina Šrajer Gajdošik, Assistant Professor, University of Osijek, Croatia
12:15	AI as a Tool in One Health	Prof. Nihad Fejzić, Faculty of Veterinary Medicine, University of Sarajevo
13:00	Agricultural Production: The Key to a Healthier and More Sustainable Planet?	Prof. dr. Dragana Latković, Faculty of Agriculture, University of Novi Sad
13:45	Implementation of One Health Approaches in Veterinary Medicine: Applying Infection Prevention and Control (IPC) Algorithms Based on Human Medicine Bundles	Dragomir Ivanov, PhD Researcher, Faculty of Public Health, Medical University of Varna; Member, Bulgarian Association "One Health", Varna, Bulgaria
14:30–15:30	Break	
15:30–16:15	Poster session	Moderator: Prof dr Nikolina Novakov Presenters:
	Challenges in the Implementation of the One Health Concept	MSc Miljan Rančić, World Health Organization (WHO), Country Office Belgrade, Serbia
	From Soil to Sink – Nitrates and Nitrites in Drinking Water in Vojvodina: A One Health Perspective	Dragana Batinica Pamuk, Institute of Public Health Subotica
	Antimicrobial Resistance on Dairy Farms in Serbia and Slovenia	Marija Kovandžić, University of Belgrade – Faculty of Veterinary Medicine, Department of Food Hygiene and Technology, Belgrade, Serbia
16:15–17:30	Panel Discussion	
	Multidisciplinarity, Communication and Collaboration in the Concept of One Health	• Prof. Dr. Marija Jevtić, Faculty of Medicine, University of Novi Sad; Institute of Public Health of Vojvodina; One Health Association of Serbia; Full Member of AMS SMS (inaugural lecture) Panelists: • Prof. Dr. Branislava Belić, Full Member of AMS SMS • Prof. Dr. Slavča Hristov, Faculty of Agriculture, University of Belgrade, Serbia; One Health Association of Serbia
17:30–18:00	Conclusion remarks	

Lecturers/panelists:

Associate Professor Martina Šrajer Gajdošik
J. J. Strossmayer University of Osijek – Department of Chemistry
Croatia

Martina Šrajer Gajdošik is an Associate Professor at the Department of Chemistry, University of Josip Juraj Strossmayer of Osijek, where she teaches and mentors students in the various fields of biochemistry and currently serves as Vice Head of the Department for teaching and student affairs. She graduated from the Faculty of Food Technology in Osijek and earned her Ph.D. in 2014 from the Faculty of Science, University of Zagreb.

Her research expertise includes proteomics of foodborne pathogens under antimicrobial stress, molecular mechanisms in carcinogenesis, and biochemical profiling of plants. She was awarded a Fulbright Scholarship for research at the COBRE Center for Cancer Research and Development, Rhode Island Hospital, and Brown University, Providence, USA (2010–2011). She also completed research training at the Institute of Analytical Chemistry, University of Vienna, Austria. She is the author of 27 peer-reviewed papers and a book chapter indexed in the Web of Science and has participated in more than 25 national and international conferences.

She participated as a collaborator in four scientific projects funded by the Croatian Science Foundation and the University of Osijek, as well as one professional project supported by the European Economic Area (EEA) Financial Mechanism.

Dr Milka Sokolović, PhD
Director General, European Public Health Alliance (EPHA);
Steering Committee Member of WHO Civil Society Task Force on Antimicrobial Resistance
Brussels, Belgium

As Director General, Milka leads EPHA in improving health and strengthening the voice of public health in Europe. Previously, she was Head of Science at the European Food Information Council, and Director of the Advanced Programme of the European Nutrition Leadership Platform.

She started her academic career at the Institute of Molecular Genetic & Genetic Engineering in Belgrade, before moving to the University of Amsterdam, where she worked as researcher in nutrigenomics, and lecturer in biochemistry, DNA technology, metabolism and genomics.

Milka holds a degree in Biology from the University of Belgrade, and a PhD in Medicine from the University of Amsterdam.

In addition to her leadership role, Milka was selected as a civil society representative for the UNGA79 High-Level Meeting on AMR. She was recently appointed as the Steering Committee Member of WHO Civil Society Task Force on Antimicrobial Resistance, reflecting her recognised expertise in this global health priority. She is an active member of the European Board on Agriculture and Food (EBAF), co-coordinates the AMR Stakeholder Network as well as the AMR Interest Group of the Members of the European Parliament – all reinforcing her commitment to advancing AMR advocacy through inclusive, multi-sectoral dialogue.

Dr. Dragomir Ivanov
One Health Bulgarian Association
National Coordinator and Liaison Officer – EU JAMRAI 2 (European Joint Action on Antimicrobial Resistance and Healthcare-Associated Infections)
Bulgaria

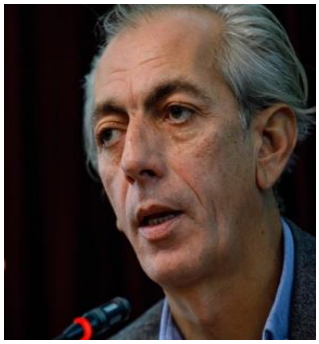
VMD, Faculty of Veterinary Medicine, University of Forestry, Sofia (2003), with honors
Postgraduate specialization in Veterinary Epidemiology and Infectious Diseases
Master's degree in Public Health and Health Management, Medical University – Pleven (2019)
PhD Candidate in Public Health, Medical University "Prof. Dr. Paraskev Stoyanov" – Varna. Research focus: Infection Prevention and Control within the One Health framework.

Professional Experience:

- Research Associate, National Diagnostic Research Veterinary Institute (NDRVMI), Sofia Practicing veterinarian – companion animals (2003–2006) and food-producing animals (2009–present)
- Innovator and manager in the business sector, focused on prevention and control of HAIs
- Independent consultant, auditor, and trainer in infection prevention and control through own initiative "Health Point | #thinkPrevention" and "RSR" Infection Prevention and Control.

Memberships: Founder, Co-founder, and Chairman – "ONE HEALTH" Bulgarian Association
Member of the Bulgarian Veterinary Union, Member – Bulgarian Scientific Society of Epidemiology of Infectious and Non-Infectious Diseases

Current Role in the One Health Perspective:
• National Coordinator and Liaison Officer – EU JAMRAI 2 (European Joint Action on Antimicrobial Resistance and Healthcare-Associated Infections), funded by the European Commission. The role supports EU Member States in developing and implementing National Action Plans on AMR and in strengthening IPC measures in both human and veterinary healthcare.
• Professional objective: To contribute expertise, care, and high professional standards, strengthened by active collaboration with internationally recognized experts. The focus is on advancing the protection of human and animals life and public health through research and the implementation of the "ONE HEALTH" concept, while bridging the gap between business and science.



Professor dr Nihad Fejzić
Faculty of Veterinary Medicine. University of Sarajevo,
Sarajevo,
Bosnia and Herzegovina

Prof. Dr. Nihad Fejzić is a veterinary epidemiologist and professor at the Faculty of Veterinary Medicine, University of Sarajevo (UNSA-VF).

He previously served as Dean of the Faculty and as Deputy Director of the Veterinary Administration of Bosnia and Herzegovina. Currently, he is President of the REEV-MED network (Network of Establishments for Veterinary Education in the Mediterranean) and European Voting Member of the Council on International Veterinary Medical Education (CIVME) under the AAVMC.

Prof. Fejzić's academic and professional work bridges veterinary education, epidemiology, food safety, and One Health, with a focus on strengthening health systems and biosecurity in the Balkans, Asia and Africa.

He has led or contributed to numerous international initiatives with FAO, WOAH, EU, and IAEA**,** addressing aquatic and animal health, zoonoses, and risk analysis. His publications and policy work emphasize innovation, intersectoral collaboration, and sustainable animal health management.

Dr vet med Boban Đurić, PhD,
Ministry of Agryculture, Repulic of Serbia

Boban Đurić is the head of the Animal Health department in the Veterinary Directorate of the Ministry of Agriculture, Forestry and Water Management. He was born in Požarevac on October 18, 1968. He completed his studies in Veterinary medicine in 1994. and he was specialized in parasitology in 2008.

After clinical work in the field, he worked more than 20 years in the veterinary inspection of the Veterinary Administration in the Braničevo district, of which 8 years he was the head of the veterinary inspection for this district, after which he continued to work in the Veterinary Directorate in several management positions, and in 2018. he was appointed to the position of head of the animal health department, which is his current position.

As part of his official activities, he is responsible for controlling, monitoring, and suppressing infectious animal diseases and zoonoses, management of crisis situations, as well as activities within the "One Health" concept.

He has several published works in the fields of parasitology, epizootiology, and zoonoses. He completed numerous trainings in the country and abroad in animal health protection, food safety, crisis management, and zoonoses.

Prof. Dragana Latković,
Faculty of Agriculture, University of Novi Sad
Director of Institute of Field and Vegetable Crops
Serbia

Prof. Dr. Dragana Latković is a full professor at the Faculty of Agriculture, University of Novi Sad, where she teaches and researches in the field of field crop production. She earned her BSc in Agricultural Sciences from the University of Zagreb (1990), and her MSc (2002) and PhD (2010) from the University of Novi Sad.

With over 30 years of academic and professional experience, she has held positions at the University of Zagreb, the Institute of Field and Vegetable Crops, and the University of Novi Sad, advancing through all academic ranks. She has participated in numerous international study visits and scientific conferences across Europe, and has been involved in 15 national and international research projects, several as project coordinator.

Prof. Latković has authored over 260 scientific publications, including 31 papers in international journals with impact factors, and co-authored national monographs, textbooks. She has mentored students at all academic levels and served on various academic committees.

She is a member of several professional associations, including the European Society for Agronomy. Prof. Latković previously served as Head of the Department of Field and Vegetable Crops and currently holds leadership role at the Institute of Field and Vegetable Crops.

MSc Miljan Rančić
World Health Organization (WHO), Country Office Serbia
Serbia

He is an Environmental engineer with two master's degrees – in public health and in environmental health.

He had worked for many years at the National Institute of Public Health of Serbia, serving in several positions related to environmental health, drinking, underground, bottled, surface and wastewater quality, as well as the health emergency management.

Since 2018, he has worked for the WHO, covering the following areas at the WHO Country Office Serbia: International Health Regulation (IHR) implementation, health emergency management, laboratory diagnostics capacities, communicable diseases (including zoonoses) surveillance, prevention and control, infection prevention and control, immunization, medicines and medical devices regulation, One Health approach, biotechnology and others.

From 2009 to 2020, he was a part-time lecturer at the Belgrade Medical College. He has extensive experience in developing legislation, strategies, programs, action plans, and other strategic and operational documents. He has actively participated and presented in numerous national and international conferences, meetings, symposia and congresses.

He also has experience with supporting other countries in the area of health emergency management and IHR implementation.

Dr Slavča Hristov, full professor
University of Belgrade - Faculty og Agriculture, Nemanjina 6, 11080 Belgrade - Zemun, Republic of Serbia

Slavča Hristov was born in 1960 in Božica. He graduated from the Faculty of Veterinary Medicine in 1985, where he later obtained both his Magister's degree and PhD in 1992. At the Faculty of Agriculture, University of Belgrade, he began his academic career in 1986 as an Assistant Trainee and was promoted to Full Professor in 2004.

He completed advanced training at the University of Bonn (1989) and study stays in Switzerland (2011), France (2015) and Sweden (2022). His professional development includes specialized training in teaching and research in agricultural sciences and organic agriculture (2003), Life Cycle Swine Health and Risk (2006), and HACCP on dairy and beef farms (2008–2009). Between 2009 and 2010, he completed eight modules within the animal welfare training program for trainers, organized by the RSPCA, University of Bristol (UK), and the Faculty of Veterinary Medicine in Skopje. In 2016, he participated in the TRAIN program for academic teaching and research staff.

He has worked at higher education institutions in Novi Sad, East Sarajevo, Podgorica, and Prokuplje. As a manager and researcher, he has contributed to 15 national and 6 international projects focusing on breeding conditions, animal welfare, health protection, and biosecurity of livestock, as well as innovations in agricultural and veterinary medicine education.

He has authored over 350 scientific papers, three textbooks, and seven monographs, and has presented at more than 70 scientific conferences in Serbia and abroad. He has supervised multiple graduate, specialist, and doctoral theses.

Prof dr Branislava Belić
Academy of Medical Sciences SLD, Full professor in retirement

Dr. Branislava Belić is a retired full professor. She worked at the Department of Veterinary Medicine, Faculty of Agriculture, University of Novi Sad, in the narrower scientific field of Pathology-Pathologica Physiology.

By education, she is a doctor, doctor of medical sciences, specialist in transfusionology and subspecialist in hematology. She worked at the Blood Transfusion Institute of Vojvodina, Novi Sad and the Faculty of Medicine in Novi Sad. She is one of the organizers of the "One Health Day" within the AMN SLD.

She has been a regular member of AMN-SLD since May 2022. She published 550 professional-scientific papers in various scientific and professional journals, participated in 10 projects and wrote 6 textbooks, 8 auxiliary textbooks, 4 monographs and 3 chapters in monographs.

Prof dr Marija Jevtic
University of Novi Sad, Faculty of Medicine
Full member of the Academy of Medical Sciences Serbian Medical Society

- Full professor at University of Novi Sad, Faculty of Medicine, specialist in Hygiene and medical ecology (Public Health) at the Institute of Public Health of Vojvodina, primarius
- Research collaborator at the Université Libre de Bruxelles, School of Public Health, Research Centre on Environmental and Occupational Health.
- Full member of the Academy of Medical Sciences Serbian Medical Society.
- Group analyst (National and European Certificate) and System Psychodynamic Organizational Consultant.

She has almost 30 years of experience in the research and education process and advocacy in public health and environment and health. Field of interest and work: public health, one health, planetary health environment and health, SDGs, climate change and health, disaster and health, migration, mental health, school health, culture and health, food safety and nutrition, health management, group psychotherapy, organizational consulting. She has published more than 400 papers in international and national journals and more chapters in textbooks and monographs, as well as conference papers. Also, she participates in several scientific and professional projects.

President of the Environment and Health Section European Public Health Association (EUPHA); Member of Scientific Advisory Committee of European Health Management Association (EHMA);m Chair of Special interest group on One Health (EHMA); Unesco Global Health Education - National Representative; EU Climate Pact Ambassador; Member of the Organizing committee of the Symposium "One Health Day" within the Academy of Medical Sciences SMS.

Abstracts of lecturers/panelists:

European One Health as a Priority Concept in Combating Antimicrobial Resistance
Концепт Једно здравље као европски приоритет у борби против антимикробне резистенције

Dr Milka Sokolović, PhD
Director General, European Public Health Alliance (EPHA);
Brussels, Belgium

Antimicrobial resistance (AMR) is a growing global health crisis that transcends human, animal, and environmental boundaries. In Europe, the One Health approach is increasingly recognised as a priority concept for addressing this complex challenge through integrated, cross-sectoral action.

Despite advances such as the 2024 United Nations General Assembly Declaration on AMR, gaps persist, particularly in curbing antimicrobial overuse in agriculture and ensuring policy coherence across sectors.

In this context, EPHA has an important role in advocating for One Health–based policies at the EU level, bringing together public health stakeholders, civil society, and decision-makers to promote coordinated action on AMR, food systems, and environmental health.

Embedding One Health within European frameworks offers a strategic opportunity to foster coordination between public health, veterinary, and environmental systems while advancing health equity and sustainability.

This presentation explores how Europe can operationalise One Health to lead global efforts against AMR, strengthen resilience, and secure a healthier future for all.

Avian Influenza in Serbia: Surveillance, Biosecurity and Multisectoral response in the context of the One Health concept
Авијарна инфлуенца у србији: надзор, биосигурност и мултисекторски одговор у контексту концепта Једно здравље

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Ministry of Agryculture, Repulic of Serbia

Avian influenza (AI) is a significant zoonotic disease with high epizootiological and epidemiological relevance, requiring coordinated action across veterinary medicine, public health, environmental protection, and food safety sectors.

In accordance with the One Health approach, the Republic of Serbia implements a coordinated system of surveillance and control of avian influenza, with particular emphasis on early detection of the virus in wild bird populations and prevention of its introduction into domestic poultry. During 2024 and 2025, sporadic cases of highly pathogenic avian influenza (H5N1) were recorded in wild birds, primarily in ecologically sensitive areas such as Vojvodina and the City of Belgrade, while the presence of the virus in domestic poultry, including large commercial farms, was not confirmed.

The key to successful prevention lay in the timely implementation of biosecurity measures, including protection of facilities, prevention of direct and indirect contact between wild birds and poultry, movement control, and enhanced hygiene measures on farms, supported by active and passive surveillance systems.

Serbia's response is based on a solid legislative framework and effective cooperation between veterinary, human health, and environmental sectors. No cases of the disease were recorded in humans, and economic damage remained minimal**.**

It is concluded that a sustainable response to threats such as avian influenza is only possible within the framework of an integrated and interdisciplinary approach. Continuous epidemiological surveillance, raising awareness of biosecurity at all levels of production and institutionalized communication between sectors constitute the basis for preventing the spread of zoonoses and strengthening health security.

The "One Health" concept is confirmed in this context as an indispensable framework for the strategic management of diseases at the interface of humans, animals and the environment.

The role of food chemistry in the One Health approach
Улога хемије хране у приступу „Једно здравље“

Associate Professor Martina Šrajer Gajdošik
J. J. Strossmayer University of Osijek – Department of Chemistry
Osijek, Croatia

The One Health concept recognizes that human, animal, and environmental health are inseparably linked. Within this framework, food chemistry plays a central and integrative role — describing at the molecular level how environmental processes, agricultural practices, and dietary choices influence health and sustainability across systems. Food chemistry provides the tools to understand the composition, transformation, and interactions of food constituents, as well as the fate of natural and anthropogenic chemicals in the food chain.

Chemical processes in food systems contribute to both the challenges and the solutions within the One Health paradigm. Two major dimensions are particularly relevant: chemical safety and nutritional chemistry. Chemical safety addresses the occurrence, persistence, and transformation of contaminants, disinfectants, and emerging pollutants that can affect microbial ecosystems, drive resistance, and impact food and environmental quality. Nutritional chemistry focuses on the maintenance and enhancement of essential nutrients and bioactive compounds that support metabolic balance, immunity, and overall resilience of living organisms. Together, these dimensions illustrate how food chemistry bridges environmental chemistry, toxicology, and nutrition science.

Advances in analytical and molecular tools increasingly enable integrated assessments of chemical safety and nutritional value across environmental, food, and biological matrices. Research on disinfectant–microbe interactions and on biofortification strategies exemplifies the capacity of food chemistry to connect molecular mechanisms with systemic health outcomes. By providing the chemical evidence base for sustainable food production, risk management, and nutritional improvement, food chemistry represents a key discipline underpinning the practical implementation of the One Health approach.

Artificial inteligence (AI) as tool in One health
Вештачка интелигенција као алат у концепту Једно здравље

Professor dr Nihad Fejzić, Faculty of Veterinary Medicine. University of Sarajevo, Sarajevo, Bosnia and Herzegovina

This presentation explores the political, economic, and technological dimensions of One Health an integrated paradigm linking human, animal, and environmental wellbeing. It argues that One Health is not merely a scientific concept but a political and ethical imperative in an era marked by global health threats, policy inertia, and rapid digital transformation.

Prevention of infectious disease outbreaks remains dramatically more cost-effective than response: while global prevention systems require roughly US $10–11 billion annually, pandemic management costs exceed US $30 billion per year, with COVID-19 alone inflicting an estimated US $13 trillion in losses. Yet, political short termism and uneven policy implementation continue to undermine these economic realities.

The lecture reviews the roles of major international organizations FAO, WHO, WOAH, and UNEP in shaping One Health governance and standard setting (SPS Agreement, IHR, WOAH Codes).

The discussion then shifts to the transformative potential of digitalization and artificial intelligence, emphasizing the move from “Old Medicine” diagnose and treat to “New Medicine” predict, prevent, personalize, and participate. AI’s multimodal capability to integrate diverse data streams—text, images, biosignals, environmental and sensor data offers unprecedented opportunities for early detection, ecosystem surveillance, and precision decision-making.

However, the central tension persists between visionary science and entrenched political or economic interests. The presentation concludes by urging a paradigm shift from reactive crisis management toward predictive governance, positioning veterinary services and data-driven intelligence as cornerstones of global One Health resilience.

Agricultural production: A key to a healthier and more sustainable planet?
Poljoprivredna proizvodnja: ključ zdravije i održivije planete?

Prof. Dragana Latković, Assistant professor Jelena Visković,
Faculty of Agriculture, University of Novi Sad, Novi Sad, Serbia

Agricultural production stands at a critical point due to rapid population growth, accelerating climate change, and increasing pressure on natural resources. As both a significant contributor to global environmental problems and a potential solution, agriculture plays a dual role in shaping the future of our planet.

Although this production accounts for approximately 25% of global greenhouse gas emissions, sustainable agricultural practices offer effective strategies for carbon sequestration, biodiversity preservation, and climate change adaptation.

This study explores how the transformation of agricultural systems can serve as a key driver in building a healthier and more sustainable planet. By integrating innovative approaches—such as precision agriculture, organic farming, and agroecological methods into conventional agricultural practices, it can significantly reduce its environmental footprint while regenerating natural ecosystems. Additionally, adopting circular agricultural models that minimize waste and promote the reuse of resources can decrease reliance on limited inputs and enhance the overall sustainability of food systems.

From smallholder farms to large-scale agribusinesses, the agricultural sector holds the potential to lead global efforts in combating climate change, alleviating hunger, and improving public health through the production of nutritious and sustainably grown food.

This transition requires coordinated action across governments, research institutions, the financial sector, and consumers. In conclusion, agricultural production is not merely a means of feeding the global population; it is a powerful tool for addressing some of the most pressing challenges of the 21st century.

Globally, maintaining environmental integrity, improving public health, and encouraging balanced access to natural resources all depends significantly on ensuring an environmentally friendly future for agricultural production.

Implementation of One Health Approaches in Veterinary Medicine: Applying Infection Prevention and Control (IPC) Algorithms Based on Human Medicine Bundles

Примена концепта Једно здравље у ветеринарској медицини: примена алгоритама за превенцију и контролу инфекција заснованих на пакетима мера из хумане медицине

Dr. Dragomir Ivanov,
One Health Bulgarian Association National Coordinator and Liaison Officer EU JAMRAI 2, Sofia, Bulgaria

The *One Health* approach promotes collaboration between human, animal, and environmental health sectors to address common challenges such as infection prevention and antimicrobial resistance. This study presents the practical implementation of human-medicine–based Infection Prevention and Control (IPC) algorithms in veterinary clinical settings.

Using adapted perioperative bundles and structured IPC audits, several veterinary facilities in Bulgaria introduced standardized hand hygiene, PPE use, environmental cleaning, sterilization, and antimicrobial stewardship protocols. The implementation was supported by multidisciplinary training and continuous monitoring.

Results showed measurable improvements in biosafety indicators, workflow organization, and staff compliance. In surgical units performing complex orthopedic and neurosurgical procedures, the incidence of surgical site infections was maintained below 1%, with no multidrug-resistant isolates identified. These outcomes were achieved without significant infrastructural investment, demonstrating the effectiveness of behavioral and procedural optimization.

The initiative confirms that evidence-based IPC bundles from human medicine can be successfully adapted to veterinary practice. It offers a reproducible model for reducing infection risks, limiting antibiotic use, and strengthening One Health collaboration between medical and veterinary professionals.

Multidisciplinarity, Communication and Collaboration in the One Health Concept
Мултидисциплинарност, комуникација и сарадња у оквиру концепта Једно здравље

Prof. Marija Jevtić *
Faculty of Medicine University of Novi Sad, Institute of Public Health of Vojvodina, One Health Association Serbia, *Academy of Medical Sciences of the Serbian Medical Association*
Prof dr Branislava Belic
Academy of Medical Sciences of the Serbian Medical Association
Prof. Slavča Hristov,
Faculty of Agriculture, University of Belgrade

The One Health concept represents an integrated and holistic approach to safeguarding the health of humans, animals, and ecosystems. It rests on the fundamental principles of multidisciplinarity, intersectoral collaboration, and systems thinking. In the context of today's complex global challenges ranging from emerging and re-emerging infectious diseases to climate change, biodiversity loss, and ecosystem degradation One Health concept offers a vital platform for enhancing prevention, early detection, coordinated control, and timely response to health threats that transcend species and borders.

The interdependence between humans, animals, and the environment requires a shared responsibility among all sectors. Human health cannot be sustained in isolation from animal health or environmental integrity. Therefore, veterinarians, physicians, epidemiologists, ecologists, microbiologists, public health professionals, and policymakers must work together in an atmosphere of trust and mutual understanding. Multidisciplinary cooperation ensures that knowledge and resources are pooled, risks are managed more effectively, and evidence-based decisions are made for the benefit of all.

In Serbia, the Academy of Medical Sciences of the Serbian Medical Society has for many years promoted the One Health approach through professional gatherings, educational initiatives, and scientific publications. This year's symposium builds on that tradition by emphasizing the growing importance of interdisciplinary and cross-sectoral approaches aligned with the latest international standards and recommendations.

Special focus is devoted to effective and strategic communication among professionals. Modern frameworks such as the Crisis and Emergency Risk Communication (CERC) model, recommended by the World Health Organization, highlight the need for clear, transparent, timely, and audience-appropriate messaging. Within the One Health framework, communication is not limited to technical data exchange among experts. It also involves proactive engagement of communities, local authorities, policymakers, and media representatives. Open, inclusive communication fosters public trust, supports behavioral change, and strengthens resilience against health crises.

Aligned with global frameworks, the FAO–UNEP–WHO–WOAH One Health Joint Plan of Action (2022–2026) identifies six key priorities: integrated surveillance, risk assessment, coordinated management of zoonotic and foodborne diseases, responsible antimicrobial use, ecosystem health, and sustainable development. Complementing these efforts, the new WHO document "A Unified Call for One Health" (2025) emphasizes the integration of One Health principles into

national and global strategies, education systems, and financing mechanisms to ensure continuity, accountability, and long-term sustainability.

The symposium's goals are to strengthen professional capacities, enhance scientific and practical knowledge, and promote collaboration among institutions and sectors dealing with health, veterinary medicine, ecology, agriculture, food production, and education.

By linking disciplines and fostering shared responsibility, One Health becomes not just a scientific concept but a guiding philosophy for building resilient, adaptive, and sustainable health systems. Acting together across professions, institutions, and borders is the foundation for ensuring a healthier, fairer, and more secure future for all forms of life on our planet.

**Inaugural Lecture: Prof dr Marija Jevtić for Full Membership of the Academy of Medical Sciences of the Serbian Medical Society*

Poster session:

Challenges in the implementation of the One Health concept
Изазови у имплементацији концепта Једно здравље

MSc Miljan Rančić
World Health Organization (WHO), Country Office Serbia

Only recently has the awareness about the full inter-causality, interdependence, and deep connection between human health and the health of animals and plants (the environment) (finally) matured. Human and animal health are most closely linked (the vast majority of pathogens, causative agents of infectious diseases that affect humans, are zoonotic in nature)
The condition for both of these healths is a healthy environment.

One health, as a precisely defined and formalized concept, is still relatively new and not sufficiently known to the wider population. Landmarks of the UN engagement in One Health promotion are Quadripartite (FAO/OIE/WHO/UNEP), Guide to implementing the One Health Joint Plan of Action at the national level (December 2023)

- One Health High-level Expert Panel (OHHLEP)
- One Health Global Leaders Group on AMR
- One Health – Joint Plan of Action
- Global Plan of Action for One Health (2022-2026) (GPA).

Four steps in the One Health implementation are essential and interdependent: Advocacy, Formalization, Institutionalization, Operationalization
Challenges in implementation are the same at all levels from local, through national, to international – so within the UN too: Unclarities in the concept itself; Lack of advocacy; Lack of political will; Traditional sectoral jurisdiction division; Financing (budget distribution – budget lines)
The situation in Serbia is quite favorable compared to many countries, including EU members:

- The existence of functional informal mechanisms (influenza surveillance, West Nile fever, integrated mosquito control...)
- Partial formalization and institutionalization (Rulebook on the method of monitoring zoonoses and zoonotic agents, Management of antimicrobial resistance, food safety, Protocol on water and health, management of chemicals in the healthcare system, monitoring of air pollution...)

From soil to sink- Nitrates and Nitrites in Drinking Water in Vojvodina: A One Health Perspective
Од земљишта до чесме – нитрати и нитрити у води за пиће у Војводини: перспектива концепта Једно здравље

Dragana Batinica Pamuk[1] , Emil Živadinović[2] , Stanka Bobić[2] , Marija Jevtić [2,3] , Sanja Bijelović [2,3]

[1]Zavod za javno zdravlje Subotica; [2]Institut za javno zdravlje Vojvodine, Novi Sad; [3]Univerzitet u Novom Sadu, Medicinski fakultet

The increasing use of synthetic fertilizers and intensive agriculture has contributed to higher levels of nitrates and nitrites in soil and water sources, particularly in the AP Vojvodina, which is Serbia's agricultural heartland. Nitrogen that plants fail to absorb often leaches into groundwater, raising concerns for public and animal health and ecosystems, recognised as One Health approach.

The risk to human health from nitrites is associated with methemoglobinemia in infants and the formation of N-nitroso compounds, which can cause digestive cancers. In contrast, the risk from nitrates is linked to the metabolic conversion of N compounds. In animals, especially cattle and other ruminants, high nitrate intake can lead to reduced fertility, slower growth, and even fatal poisoning. Environmentally, nitrate runoff accelerates eutrophication in rivers and lakes, leading to algal blooms, low oxygen levels, and the decline of aquatic biodiversity. This study examines nitrate and nitrite levels in unpurified drinking water in AP Vojvodina and evaluates related health risks using data from 2023, which includes 11,919 unpurified drinking water samples analyzed by accredited spectrophotometric methods at seven accredited public health institutes.

Nitrite levels exceeded the national limit (0.03 mg/L) in 3.83% of samples, with an average of 0.030 mg/L and maximum values of 1.005 mg/L. The chronic nitrite hazard index (HI) for adults and children, calculated using the US EPA methodology, was less than one, indicating an acceptable level. The average nitrate concentration was 5.229 mg/L, while the maximum value was 139 mg/L, which exceeded the legal limit of 50 mg/L. The nitrate HI for the average nitrate concentration was acceptable for both adults and children, but not for the maximum concentration (2.25E+00 for adults and 9.27E+00 for children). The results emphasize the need to build capacities for environmental monitoring and more sustainable agricultural and veterinary practices to protect human health.

Antimicrobial Resistance on Dairy Farms in Serbia And Slovenia
Антимикробна резистенција на фармама музних крава у Србији и Словенији

Marija Kovandžić[1], Bojan Papić[2], Darja Kušar[2], Majda Golob[2], Irena Zdovc[2], Jana Avberšek[2], Snežana Bulajić[1]

[1] University of Belgrade – Faculty of Veterinary Medicine, Department of Food Hygiene and Technology, Belgrade, Serbia, [2] University of Ljubljana, Veterinary Faculty, Institute of Microbiology and Parasitology, Ljubljana, Slovenia

Dairy farming represents one of the key sectors of agricultural production in both Serbia and Slovenia. However, the growing intensification of milk production increases the susceptibility of dairy cows to various diseases, often resulting in frequent antibiotic use. Such practices contribute to the emergence of antimicrobial resistance (AMR) and facilitate the dissemination of resistance genes among bacteria in animals, the farm environment, and humans.

This study investigated the presence of multidrug-resistant bacteria (MDRB) in bulk tank milk samples collected from 100 Serbian and 106 Slovenian dairy farms. The isolation of MDRB was performed on selective culture media according to the established protocols proposed by the European Reference Laboratory for Antimicrobial Resistance (EURL-AR) and internal procedures. Ten methicillin-resistant *Staphylococcus aureus* (MRSA), 13 *Escherichia coli*, and two *Klebsiella pneumoniae* isolates producing extended-spectrum beta-lactamases (ESBL) were detected. No carbapenemase-producing Enterobacteriaceae (CPE), vancomycin-resistant Enterococci (VRE), or colistin-resistant *E. coli* were detected in any of the analysed milk samples. The present findings indicate that raw milk may serve as a potential reservoir and transmission route for MDRB and resistance genes, highlighting the importance of a One Health approach to monitoring and mitigating AMR.

The study was conducted within the research program "Animal Health, Environment and Food Safety" (P4-0092) and the bilateral scientific project "Raw milk as a potential source of multidrug-resistant bacteria and resistance genes" (BI-RS/23-25-007), in collaboration between researchers from Serbia (Faculty of Veterinary Medicine, Belgrade) and Slovenia (Institute of Microbiology and Parasitology, Veterinary Faculty, Ljubljana).

Key words: bulk tank milk, food safety, multidrug-resistant bacteria (MDRB), one health

International Symposium of the Academy of Medical Sciences
Serbian Medical Society
ONE HEALTH DAY 2025

CHALLENGES IN THE IMPLEMENTATION OF THE ONE HEALTH CONCEPT

Miljan Rančić
WHO Country Office Serbia

Public awareness of the One Health concept

One health, as a precisely defined and formalized concept, is still relatively new and not sufficiently known to the wider population and there are various challenges in its implementation..

UN and One Health

- Quadripartite (FAO/OIE/WHO/UNEP), **Guide to implementing the One Health Joint Plan of Action at the national level (December 2023)**
- One Health High-level Expert Panel (**OHHLEP**)
- One Health Global Leaders Group on AMR
- One Health – Joint Plan of Action
- **Global Plan of Action for One Health (2022-2026) (GPA)**

From idea to implementation

- Advocacy
- Formalization
- Institutionalization
- Operationalization

Challenges in implementation

- Same at all levels – from local, through national, to international – so within the UN too
- Unclarities in the concept itself
- Lack of advocacy
- Lack of political will
- Traditional sectoral jurisdiction division
- Financing (budget distribution – budget lines)

WHO's experience with One Health in Serbia

- The situation is quite favorable compared to many countries, including EU members
- The existence of functional informal mechanisms (influenza surveillance, West Nile fever, integrated mosquito control…)
- Partial formalization and institutionalization (Rulebook on the method of monitoring zoonoses and zoonotic agents, Management of antimicrobial resistance, food safety, Protocol on water and health, management of chemicals in the healthcare system, monitoring of air pollution…)
- Vojvodina is particularly at the forefront of the institutionalization and operationalization of One Health (Integrating anthropozoonoses surveillance across different sectors)

WHO activities in the field of One Health in Serbia

- Support to existing formal and informal One Health mechanisms (AMR, food safety, zoonoses surveillance and control)
- Support for the application of a structured methodology for One Health operationalization at the national level
- JEE – Joint External Evaluation of national capacities for IHR implementation
- National Bridging Workshop (October/November 2019)
- National Action Plan for Health Security (NAPHS)
- Support for the development of a Protocol for joint field investigation and response

References

1. One Health High-Level Expert Panel (OHHLEP). One Health definitions and principles [Internet]. Geneva: World Health Organization; 2023 [cited 2025 Jun 1]
2. World Health Organization. Local-level policy recommendations: operationalizing a One Health approach. Political statement of the WHO European Healthy Cities Network. Copenhagen: WHO; 2022.
3. Food and Agriculture Organization of the United Nations, United Nations Environment Programme, World Health Organization, World Organisation for Animal Health. One Health joint plan of action (2022–2026): working together for the health of humans, animals, plants and the environment [Internet]. Rome: FAO; 2022 [cited 2025 Apr 16].

From soil to sink - Nitrates and Nitrites in Drinking Water in Vojvodina: A One Health Perspective

Dragana Batinica Pamuk[1], Emil Živadinović[2], Stanka Bobić[2], Marija Jevtić[2,3], Sanja Bijelović[2,3]
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The increasing use of synthetic fertilizers and intensive agriculture has contributed to higher levels of nitrates and nitrites in soil and water sources, particularly in the AP Vojvodina, which is Serbia's agricultural heartland. Nitrogen that plants fail to absorb often leaches into groundwater, raising concerns for public and animal health and ecosystems, recognised as One Health approach.

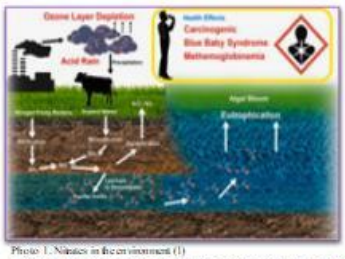
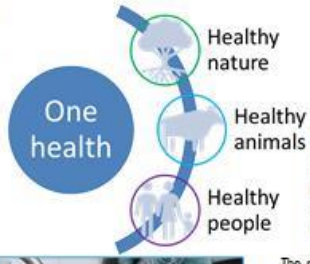


Photo 1. Nitrates in the environment (1)


Photo 2. Water and health (2)

This study examines nitrate and nitrite levels in unpurified chlorinated drinking water in AP Vojvodina and evaluates related health risks using data from 2023, which includes 11,919 unpurified chlorinated drinking water samples analyzed by accredited spectrophotometric methods at seven accredited public health institutes.



Environmentally, nitrate runoff accelerates eutrophication in rivers and lakes, leading to algal blooms, low oxygen levels, and the decline of aquatic biodiversity.

In animals, especially cattle and other ruminants, high nitrate intake can lead to reduced fertility, slower growth, and even fatal poisoning. (3)

The risk to human health from nitrites is associated with methemoglobinemia in infants and the formation of N-nitroso compounds, which can cause digestive cancers.

Nitrite levels exceeded the national limit (0.03 mg/L) in 3.83% of samples, with an average of 0.030 mg/L and maximum values of 1.005 mg/L. The chronic nitrite hazard index (HI) for adults and children, calculated using the US EPA methodology, was less than one, indicating an acceptable level. The average nitrate concentration was 5.229 mg/L, while the maximum value was 139 mg/L, which exceeded the legal limit of 50 mg/L.

Photo 3. Potential health effects from nitrates in drinking water (4)

The nitrate HI for the average nitrate concentration was acceptable for both adults and children, but not for the maximum concentration (2.25E+00 for adults and 9.27E+00 for children).

The results emphasize the need to build capacities for environmental monitoring and more sustainable agricultural and veterinary practices to protect human and animal health.

References
1. Singh S, Asil AG, Kumar V, Kapoor D, Subramonian S, Singh J, Ramamurthy PC. Nitrates in the environment: A critical review of their distribution, sensing techniques, ecological effects and remediation. Chemosphere. 2021;281:131096. doi: 10.1016/j.chemosphere.2021.131096
2. Solomon M. More water may acquire to more health benefits. Harvard Women's Health Watch [Internet]. 2025 Mar 1 [cited 2025 Oct 26]. Available from: https://www.health.harvard.edu/staying-healthy/more-water-may-acquire-to-more-health-benefits
3. Thompson LJ. Nitrate and Nitrite Poisoning in Animals [Internet]. MSD Veterinary Manual. Merck Sharp & Dohme Corp, 2021 Apr [modified 2024 Sept; cited 2025 Oct 22]. Available from: https://www.msdvetmanual.com/toxicology/nitrate-and-nitrite-poisoning/nitrate-and-nitrite-poisoning-in-animals
4. Goddard J. Quick Guide. Nitrate and Drinking Water [Internet]. 2025 [cited 2025 Oct 20]. Available from: https://myh2ocare.com/

Antimicrobial resistance on dairy farms in Serbia and Slovenia

Marija Kovandžić[1], Bojan Papić[2], Darja Kušar[2], Majda Golob[2], Irena Zdovc[2], Jana Avberšek2, Snežana Bulajić[1]

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01. Introduction

Dairy farming and milk production are major economic sectors in both Serbia and Slovenia. As production intensity increases, dairy cows become more prone to various diseases, especially mastitis, the main reason for antimicrobial use in dairy herds. Excessive or inappropriate antibiotic use promotes the development of antimicrobial resistance (AMR) and the dissemination of resistance genes among bacteria in animals, the environment, and humans.
Multidrug-resistant bacteria (MDRB), including methicillin-resistant *Staphylococcus aureus* (MRSA), extended-spectrum β-lactamase (ESBL/AmpC)- and carbapenemase-producing Enterobacteriaceae (CPE), and vancomycin-resistant *Enterococcus* spp. (VRE), represent a significant One Health concern, with colistin-resistant enterobacteria emerging as an additional threat. The bulk tank milk reflects the on-farm situation and can serve as a good indicator of the prevalence of AMR and MDRB at the dairy farm level.

02. Objective

The aim of this study is to determine the occurrence and characteristics of MDRB, including MRSA, ESBL/AmpC and CP-producing Enterobacteriaceae, VRE, and colistin-resistant *Escherichia coli*, in bulk tank milk from dairy farms in Serbia and Slovenia, and to assess their potential public health significance within the One Health context.

03. Materials & Methods

Bulk tank milk samples were collected from 100 Serbian and 106 Slovenian dairy farms and screened for MDRB.
Isolation of MDRB was performed on selective culture media following the established protocols recommended by the European Reference Laboratory for Antimicrobial Resistance (EURL-AR) and internal procedures.
All isolates were identified to the species level using MALDI-TOF mass spectrometry and phenotypically tested for antimicrobial susceptibility using the broth microdilution method to determine the minimum inhibitory concentration (MIC). The presence of specific resistance genes was further confirmed using polymerase chain reaction (PCR) assays targeting selected antimicrobial resistance determinants.

04. Results

From the Serbian samples, five MRSA isolates and four ESBL-producing *E. coli* isolates were obtained. From the Slovenian milk samples, five MRSA isolates, nine ESBL-producing *E. coli*, and two ESBL-producing *Klebsiella pneumoniae* isolates were recovered.
No CPE, VRE, or colistin-resistant *E. coli* were detected in any of the samples.
All MRSA isolates carried either the mecA or mecC gene, conferring methicillin resistance, and at least one additional β-lactam resistance gene. Half of the MRSA isolates displayed multidrug resistance profiles.
Among the ESBL-producing Enterobacteriaceae, genes of the blaCTX-M family were the most prevalent. Most ESBL-producing *E. coli* (11/13) and both *K. pneumoniae* isolates exhibited resistance to multiple antimicrobial classes.

05. Discussion

The detection of MDRB in raw milk from both countries underscores the presence of AMR within the dairy sector in Southeastern Europe. The presence of mecA and mecC genes in MRSA, and blaCTX-M genes in ESBL-producing isolates, provides molecular evidence of clinically relevant resistance mechanisms circulating in the dairy sector.
Although no CPE, VRE, or colistin-resistant isolates were identified, the findings indicate that raw milk can act as a potential reservoir and transmission route for MDRB and resistance genes.
These findings underscore the need for continuous AMR surveillance in primary milk production and for the prudent use of antibiotics in veterinary practice. The study also supports the application of a One Health approach, integrating animal, human, and environmental health perspectives to mitigate the spread of AMR.

06. Conclusion

- Raw milk from Serbia and Slovenia contained MRSA and ESBL-producing Enterobacteriaceae, indicating the presence of multidrug-resistant bacteria in the dairy production chain.
- Continuous monitoring, molecular characterization, and public awareness are crucial to mitigate the spread of resistance.
- Implementing targeted control strategies in dairy farms is essential to protect public health and ensure the sustainability of milk production systems.