

# Human and Veterinary Medicine from a One Medicine to One Health Perspective

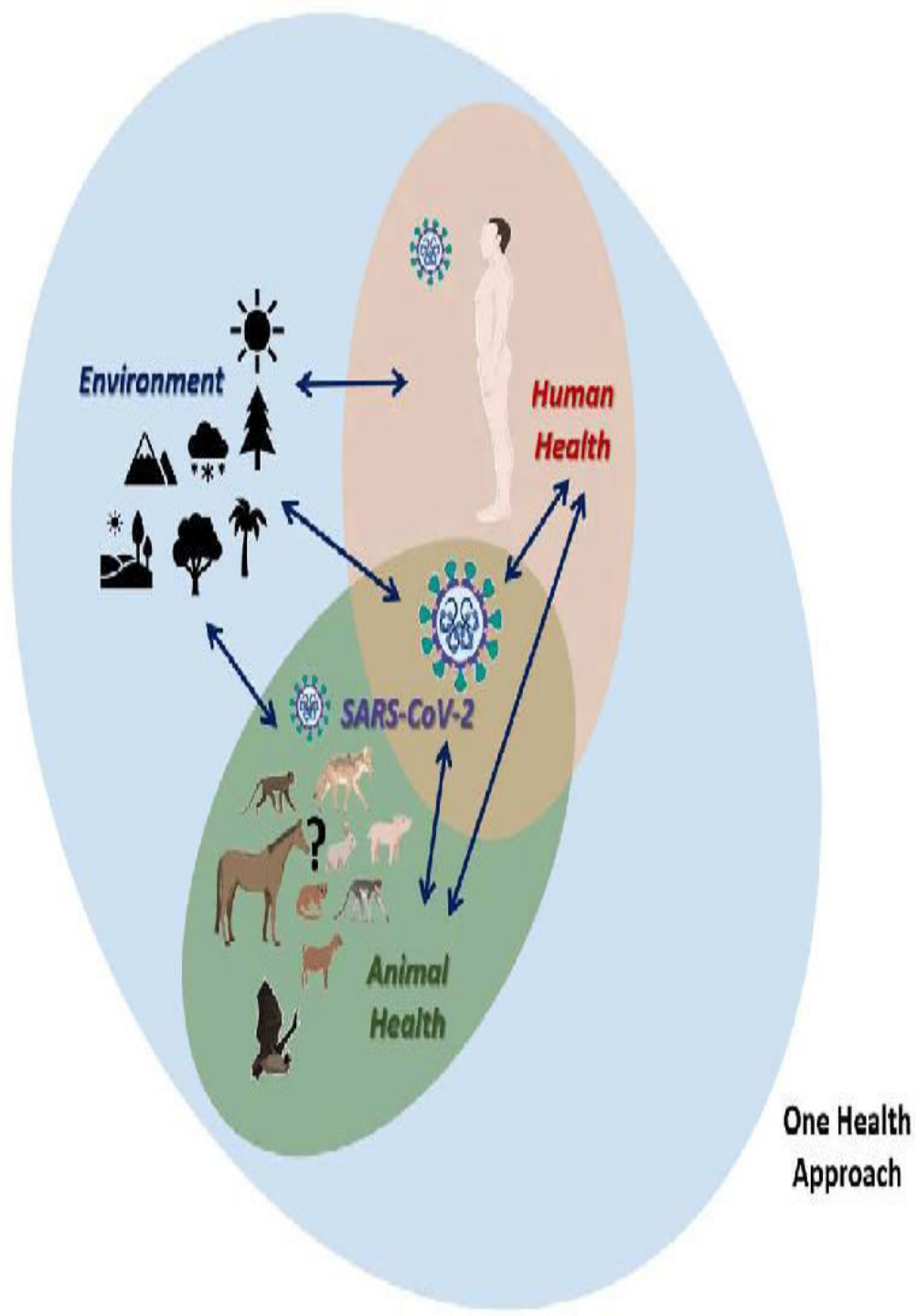


**Olga Horvat<sup>1</sup>, Zorana Kovačević<sup>2</sup>**

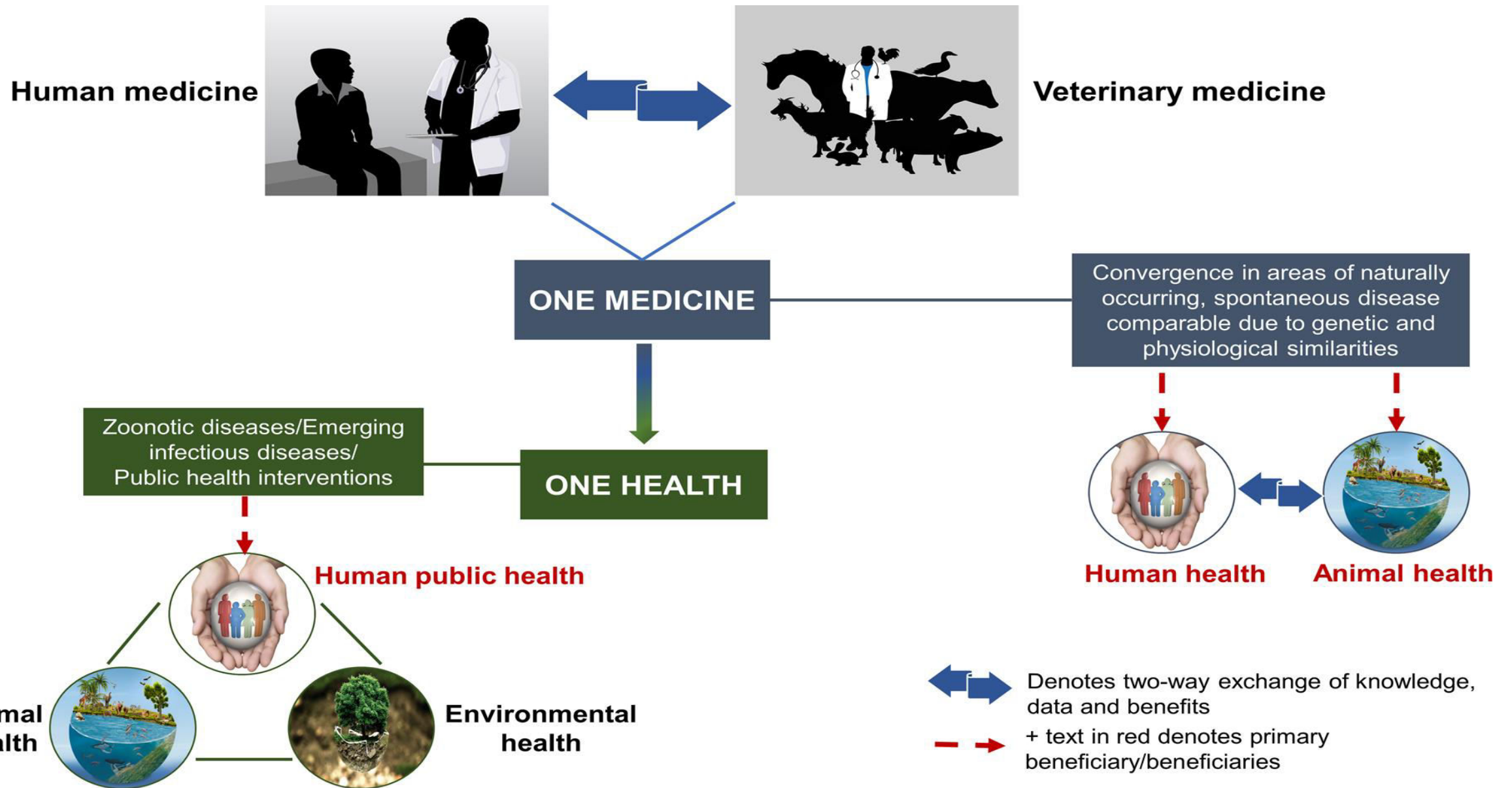
<sup>1</sup>Department of Pharmacology, Toxicology and Clinical Pharmacology, Faculty of Medicine Novi Sad, University of Novi Sad

<sup>2</sup>Department of Veterinary Medicine, Faculty of Agriculture Novi Sad, University of Novi Sad, Serbia

Sekcija za kliničku farmakologiju “dr Srdjan Djani Marković” Srpskog lekarskog društva



- The COVID-19 crisis and climate change effects have prompted global collaboration to apply One Health strategies to address key issues of health and welfare.
- The two areas of work out of six in which a One Health approach is particularly relevant include:
  - control of infectious diseases, particularly zoonoses
  - antimicrobial resistance.
- However, what is new about 'One Health'?



# Historical background of "two medicines"

- Some theories suggest that veterinary medicine emerged before human medicine.
- The value of cattle in ancient Egypt drove the study of their anatomy and physiology through domestication, care, and ritual sacrifices. This knowledge, when applied to humans, led to the origin of human medicine in ancient Egypt.
- Common knowledge between both animal and human health also occurred during the Greek and Roman eras
- Human and veterinary medicine began to diverge in the 19th century possibly due to veterinary medicine's close association to livestock and horses, before companion animal medicine gained prominence from the 1970s.

# Historical background of "two medicines" in Vojvodina, Serbia



In the 18th century, physicians took over the care of animal health, played an important role in the suppression of livestock diseases and veterinary police.

From 1819, only those physicians who have an veterinary exam, could perform the work of veterinarians.

In 1910, the health care of domestic animals was completely taken over by academically educated veterinarians.



# Notable historical exponents of the links between "two medicines"

"Between animal and human medicine there are no dividing lines-nor should there be. The object is different but the experience obtained constitutes the basis of all medicine."

Rudolf Virchow  
(1821-1902)



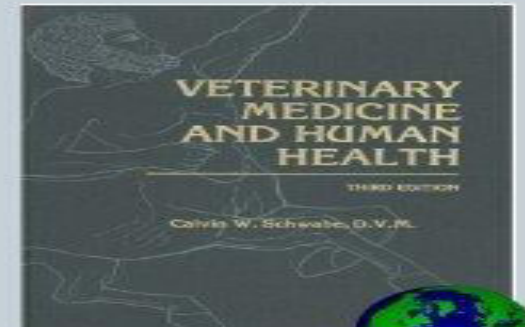
## Dr. Calvin Schwabe



Dr. Calvin  
Schwabe

"Human health provides the most logical unifying or apical cause in veterinary medicine's hierarchy of values"

(1927-2006)

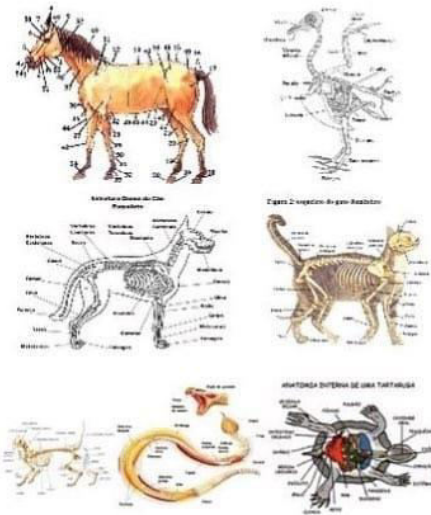


# Differences of "two medicines"

**This is difficult  
for you.**



**imagine this.**



**You Treat Human Doctors with Respect  
Your Veterinarian Deserves the Same**

| HUMAN DOCTOR                      | ANIMAL DOCTOR                                                                                                               |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>Species</b>                    |                                                                                                                             |
| Human                             | Dog, cat, horse, cattle, birds, pig, reptiles, amphibians, etc.                                                             |
| <b>Specialization</b>             |                                                                                                                             |
| One or two specializations        | All in one: anesthesiologist, cardiologist dermatologist, endocrinologist, internist, ophthalmologist, radiologist, surgeon |
| <b>Finding Out What Hurts</b>     |                                                                                                                             |
| "Which part hurts?"               | Gets bitten, scratched or kicked                                                                                            |
| <b>Collecting Blood</b>           |                                                                                                                             |
| "Please roll up your sleeve."     | 3 people restraining; finding a vein under a thick layer of fur while patient is trying to bite your face off               |
| <b>Giving Treatment</b>           |                                                                                                                             |
| "Take this tablet 2 times a day." | Hide meds in food; if patient still won't eat it, force meds while patients is struggling                                   |

# Similarities of "two medicines"

- Length of training.
- They share a root common clinical language.
- Common body of knowledge e.g. anatomy, disease origins, pathology and physiology.
- Similar dilemmas and ethical challenges e.g. obtaining consent, patient confidentiality, ethical responsibility, the cost of treatment and impact on quality of life,
- Both professions also share similar stressors e.g. long work hours, levels of responsibility and impacts e.g. depression, compassion fatigue and burnout.

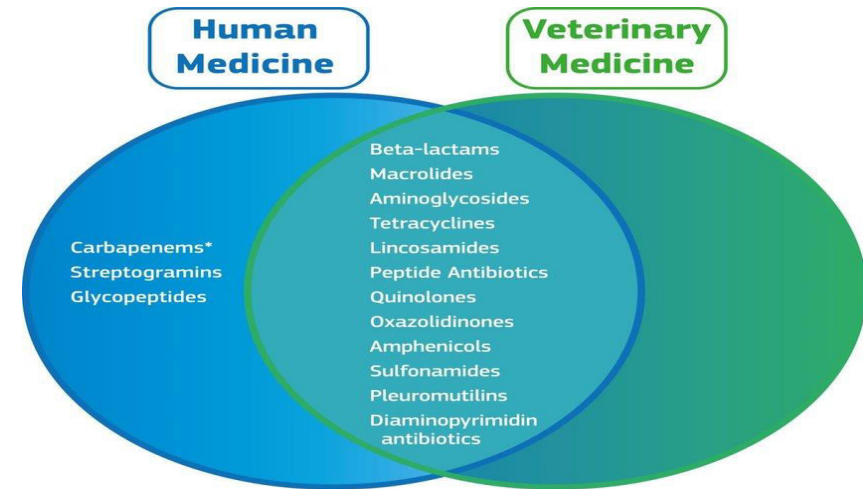
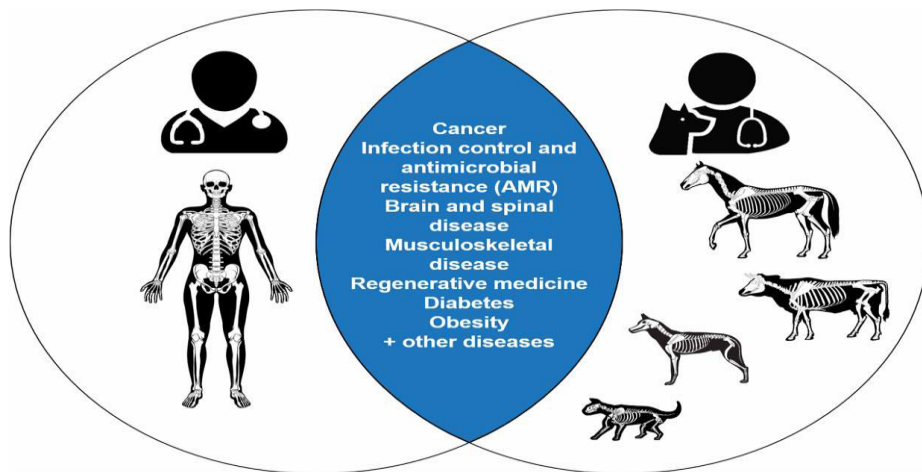
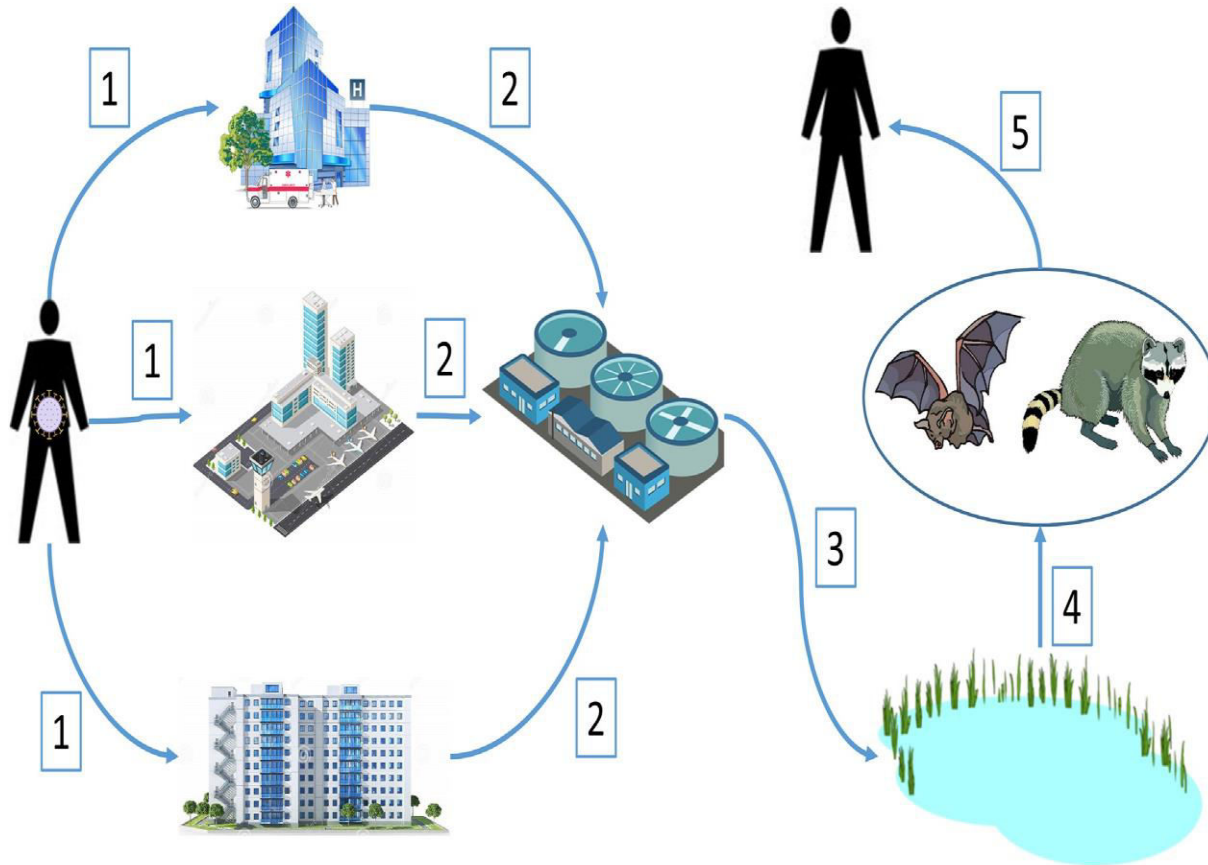


Figure 2. Areas of natural convergence and overlap between human and veterinary medicine considered for One

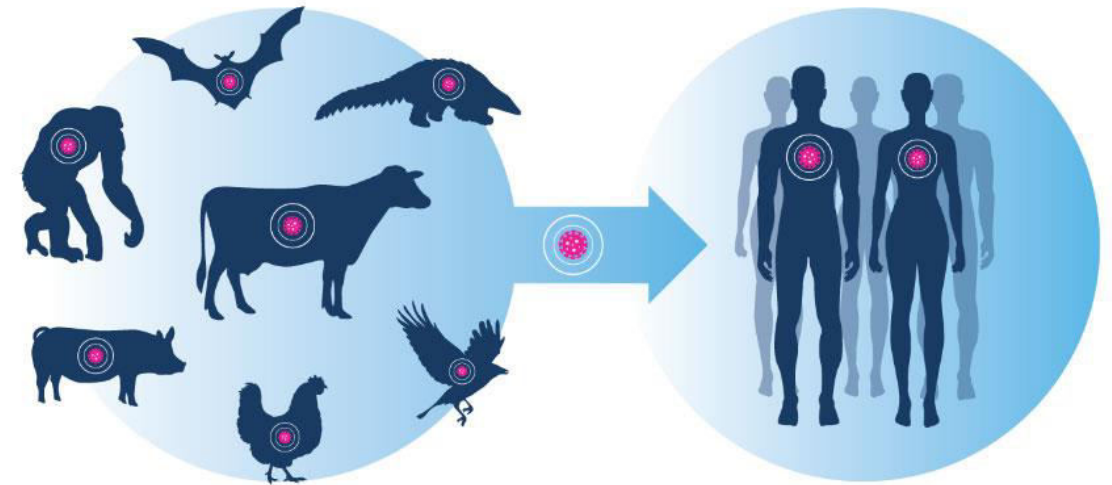


# The importance of "two medicines" in Infection control

Model of **spillover** of novel coronavirus SARS-CoV-2 into new wildlife hosts in North America and subsequent **spillback** into the human population



**Zoonoses such as COVID-19 are diseases that are transmitted from animals to humans**



**75%** of newly emerging infectious diseases are zoonoses

**60%** of infectious diseases in humans are spread from animals

Zoonotic diseases are responsible for an estimated **2.5 billion cases of illness** and **2.7 million deaths** worldwide, each year

# The importance of “two medicines” in combatting antimicrobial resistance

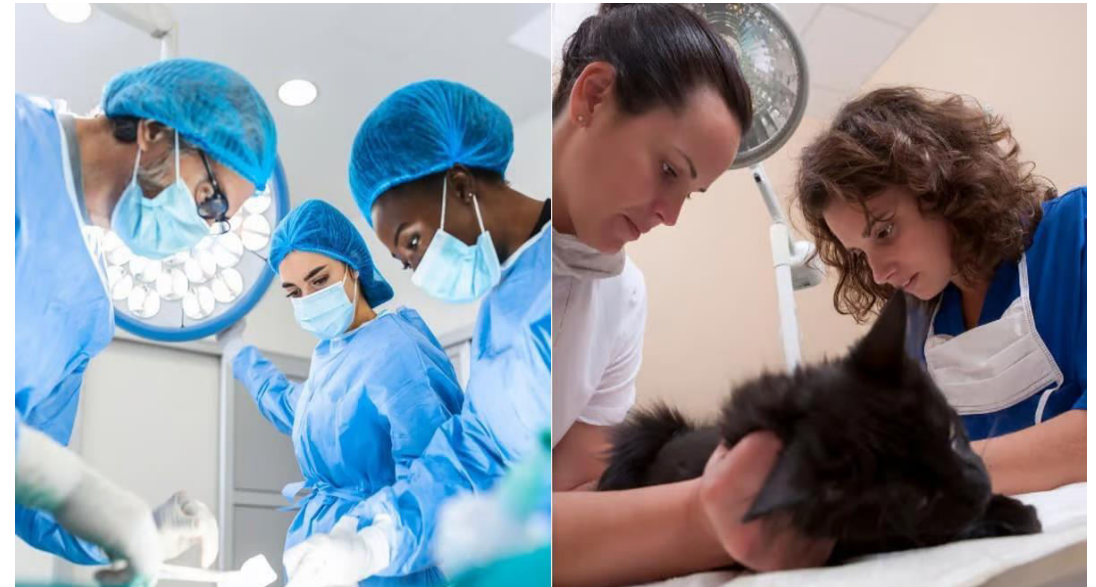
- Bacterial pathogens present health challenges to both human and veterinary medicine,
- MRSA - known in humans, also occurs in animals potentially via reverse zoonoses
- *P. aeruginosa* and *Acinetobacter baumannii* – clinical significance in Human and Veterinary Medicine
- *E.coli* - important reservoir of resistance genes
- Combined medical and veterinary usage is responsible for **100,000–200,000 tonnes of antibiotics** entering the global environment every year!



# The challenges to achieving greater connection between "two medicines"

Traditional boundaries still separate the two medical professions.

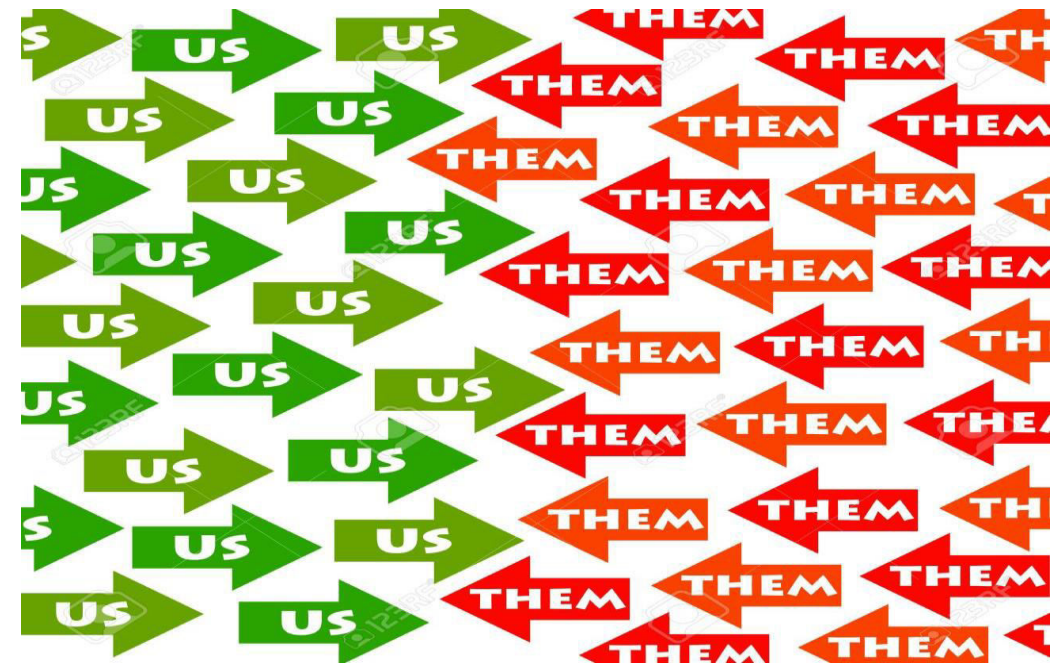
- Two medical professions remain isolated from each other:
    - professionally (throughout their training and beyond)
    - spatially (may be separated by distance on different campuses)
  - more medical schools than veterinary schools
  - greater number of physicians than veterinarians
- ↓
- animal populations, both companion animals and livestock, outnumber human populations.





# The challenges to achieving greater connection between "two medicines"

- In clinical settings, veterinarians may understand human health epidemiology more comprehensively than physicians— lack of emphasis on the importance of zoonotic disease
- Certain diseases exhibit species-specific differences e.g. genetic pathways and factors such as species and body size.
- lack of understanding by physicians and veterinarians that their professional roles complement each other  
→ perceptions of 'us against them' rather than recognition of shared risks





# Strategies to improve collaboration between “two medicines”

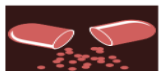
- Many countries have introduced the One Health concept in the fight against zoonoses and antimicrobial resistance.
- In practice: veterinarians better accept and promote this concept, as well as the importance of mutual cooperation, than physicians.
- New strategies are required for the One Health initiative to gain traction.
- **WHERE TO START?**
- One such strategy to improve communication is to **BEGIN WITH STUDENTS.**
- Introducing interdisciplinary group projects into the curricula of medical and veterinary schools would foster teamwork and early networking.

# Collaboration between “two medicines” on prudent use of antibiotics and in combatting antimicrobial resistance – experiences from the University of Novi Sad, Serbia





# Evaluation of the knowledge, attitude and practice towards antibiotic use among students of medicine, dentistry and veterinary medicine who will be the only prospective prescribers of antibiotics in Serbia



**antibiotics**



Article

## Survey of the Knowledge, Attitudes and Practice towards Antibiotic Use among Prospective Antibiotic Prescribers in Serbia

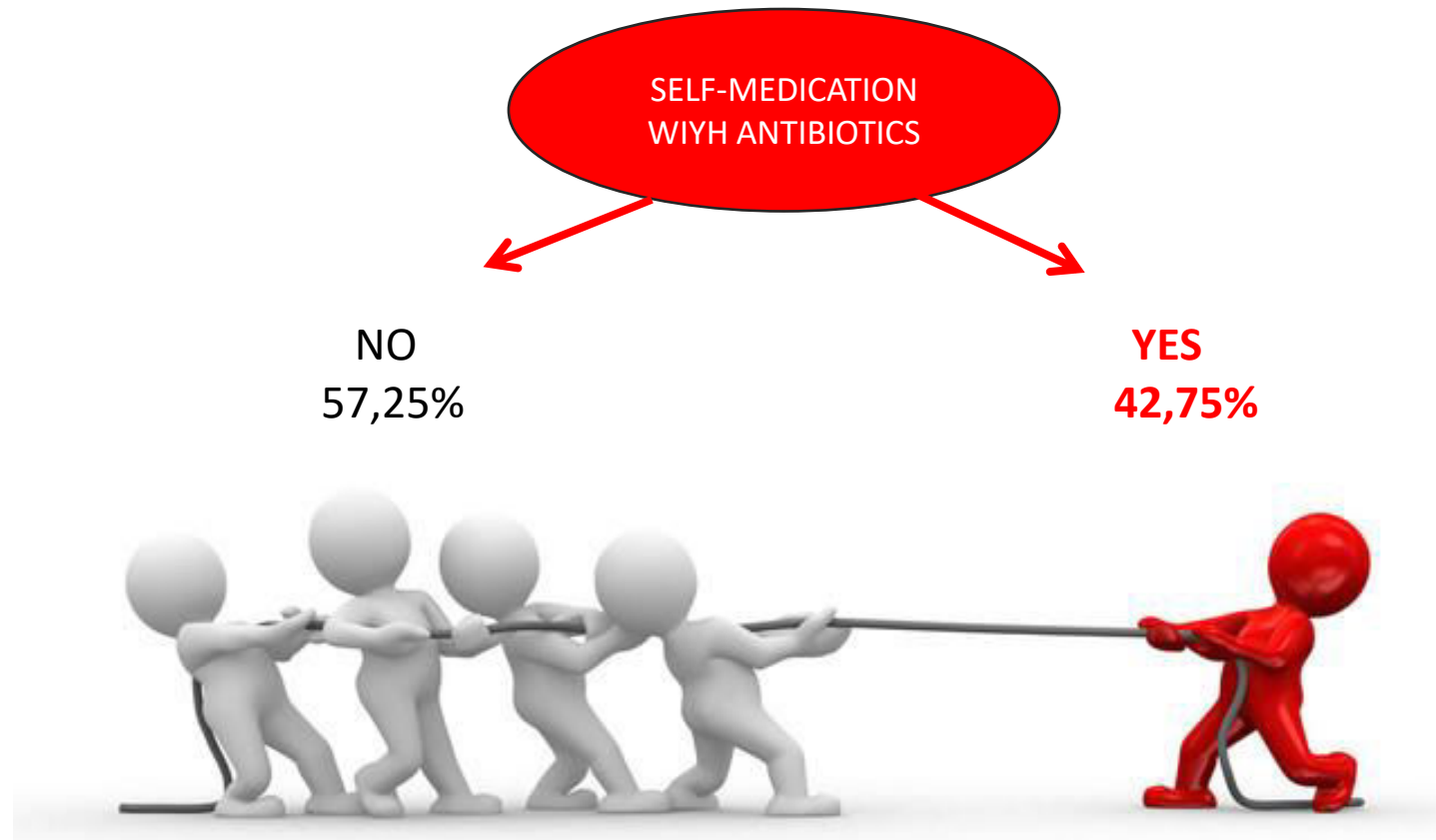
Olga Horvat <sup>1</sup>, Ana Tomas Petrović <sup>1,\*</sup> , Milica Paut Kusturica <sup>1</sup>, Dragica Bukumirić <sup>2</sup>, Bojana Jovančević <sup>1</sup> and Zorana Kovačević <sup>3</sup> 

<sup>1</sup> Faculty of Medicine, Department of Pharmacology Toxicology and Clinical Pharmacology, University of Novi Sad, 21000 Novi Sad, Serbia

<sup>2</sup> Institute of Public Health “Dr Milan Jovanovic Batut”, 11000 Belgrade, Serbia

<sup>3</sup> Faculty of Agriculture, Department of Veterinary Medicine, University of Novi Sad, 21000 Novi Sad, Serbia

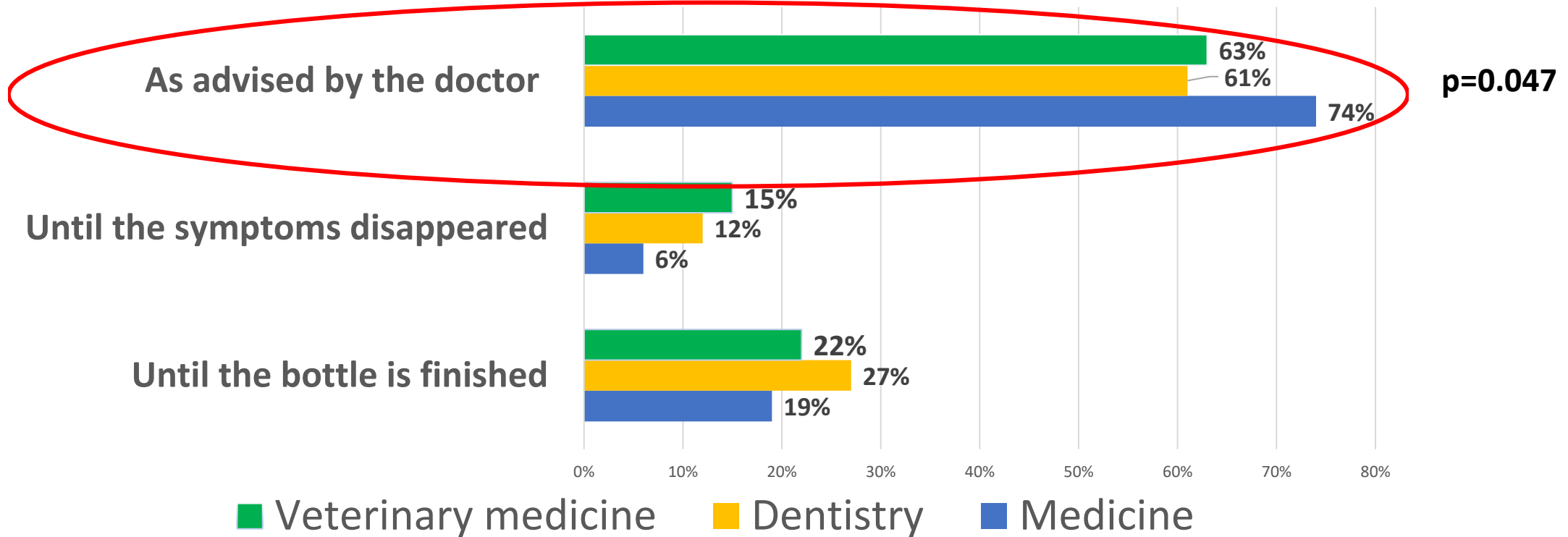
# Self-medication with antibiotics among students of medicine, dentistry and veterinary medicine





**Symptom of lack of trust in colleagues**, even though it is increasingly apparent that One Health approaches are essential to tackling antimicrobial resistance!

### How did you use antibiotics during your last infection?



Students of dentistry (61%) and students of veterinary medicine (63%) showed decreased willingness to use antibiotics during their last infection as advised by the doctor compared to students of medicine (74.5%) ( $p = 0.047$ ).

# Jointly organized "two medicines" symposium on antimicrobial resistance

**European Antibiotic Awareness Day on 18 November 2022.**

Symposium for students of veterinary medicine and medicine "Antimicrobial resistance - a challenge of the present and a threat of the future" was held on Faculty of Agriculture - Novi Sad

SIMPOZIJUM ZA STUDENTE

**"Antimikrobna rezistencija - izazov sadašnjosti, pretnja budućnosti"**

WORLD ANTIMICROBIAL AWARENESS WEEK

HANDLE ANTIMICROBIALS WITH CARE

Prof. dr **Olga Horvat**  
Medicinski fakultet Novi Sad

Doc. dr **Marko Pećin**  
Veterinarski fakultet Zagreb

Prof. dr **Iskra Cvetković**  
Veterinarski fakultet Skoplje

Prof. dr **Zorana Kovačević**  
Poljoprivredni fakultet Novi Sad

10 časova  
18. NOVEMBAR 2022.

Poljoprivredni fakultet, Novi Sad

Svečana sala

Science Fund of the Republic of Serbia



# Future steps..

- CURRENTLY:

- Re-evaluation of the educational curricula focused on Pharmacology regarding antibiotic use and antimicrobial resistance at the Medicine and Veterinary Faculty, University of Novi Sad, Serbia

- FUTURE PLANS:

- Creating an undergraduate curriculum centered on Pharmacology, specifically emphasizing the prudent use of antibiotics and tackling antimicrobial resistance with the Incorporation of the One Health Initiative at both faculties
- Introduction of an interdisciplinary group projects into the curricula of both Schools: projects exploring the similarities and differences between pathogenesis and the treatment of common communicable and non-communicable diseases affecting both animals and humans

**A PROBLEM SHARED IS A PROBLEM HALVED**

Former United States President Harry S. Truman:

**“It is amazing what can be accomplished  
when you don’t care who gets the credit”**

