

REVIEW

by Assoc. Prof. Nevyana Georgieva Feschieva, MD, PhD

of the doctoral dissertation
by Dragomir Tsvetanov Ivanov

entitled:

***“INFECTION PREVENTION AND CONTROL: PUBLIC HEALTH CHALLENGES AND
PRIORITY SOLUTIONS THROUGH THE ONE HEALTH APPROACH”***

Supervisors:

Prof. Desislava Vankova, MD, PhD, DSc

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submitted for the award of the educational and scientific degree “Doctor”
in Higher Education Area 7. Healthcare and Sports,
Professional Field 7.4. Public Health,
Doctoral Programme “Public Health Management”

By Order No. R-109-261 of the Rector of the Medical University of Varna, dated 28 July 2026, I was appointed as an external member of the Scientific Jury. At its first meeting, I was designated to prepare a review of the doctoral dissertation by Dragomir Tsvetanov Ivanov, entitled “Infection Prevention and Control: Public Health Challenges and Priority Solutions through the One Health Approach”, submitted for the award of the educational and scientific degree “Doctor” in the Doctoral Programme “Public Health Management”, Professional Field 7.4. Public Health. The dissertation title and the supervisors are specified in the final version of the dissertation submitted for defence.

Brief Biographical Information and Professional Development of the Doctoral Candidate

Dragomir Ivanov graduated from the Faculty of Veterinary Medicine at the University of Forestry – Sofia in 2003. In 2019, he obtained a Master's degree in Public Health and Health Management from the Medical University – Pleven. Since 2021, he has been a doctoral candidate at the Medical University of Varna and has fulfilled all requirements of the doctoral programme.

His professional career began as a research associate in a reference laboratory at the National Diagnostic and Research Veterinary Medical Institute in Sofia, where he worked in the field of diagnosis, surveillance and control of viral diseases in animals. In the following years, he continued his professional activities in institutions involved in veterinary public health, infection prevention and control, disinfection, and the implementation of infection safety measures. He has a very good command of written and spoken English and a good command of Serbian and Russian.

In recent years, his research and publication activities have also focused on the One Health approach, antimicrobial resistance, infection control, and the interaction between human and veterinary medicine.

The doctoral candidate's educational background and professional experience provide a logical progression towards the chosen dissertation topic. The combination of training in veterinary medicine and public health, together with practical experience in infection control, provides a sound basis for addressing a problem whose very nature calls for overcoming the traditional separation between the different sectors.

General Characteristics of the Dissertation

The dissertation comprises 186 pages and contains 12 tables and 54 figures, including 3 schematic diagrams, 49 diagrams presenting the study results, and 2 conceptual models, as well as one appendix containing two questionnaires. The reference list includes 350 sources, of which 8 are in Cyrillic and 342 in Latin script.

The dissertation is structured into four main chapters: Literature Review – 46 pages; Organisation and Methodology of the Study – 9 pages; Original Research: Results and Discussion – 91 pages; and Conclusions, Scientific and Practical Contributions, Recommendations and Proposed Conceptual Models – 7 pages.

Relevance of the Dissertation Topic

The topic of the dissertation is undoubtedly highly relevant, while extending beyond the immediate issue of infection prevention and control. At the core of the One Health approach lies the understanding that human health, animal health, and the state of the environment are

interconnected and cannot be considered in isolation. This interdependence is not a new phenomenon; however, changes in lifestyles, intensive livestock production, the movement of people, animals and food, as well as climatic and environmental changes, have made the need for coordinated action across sectors and professional groups increasingly pressing.

This need is particularly evident in the case of infectious diseases and antimicrobial resistance. The spread of microorganisms and the development of resistance do not conform to the administrative boundaries separating human and veterinary medicine. The use of antimicrobial agents, the movement of microorganisms among humans, animals, food and the environment, as well as the emergence of new infectious threats, make coordination among different professional and institutional systems a necessity rather than merely a desirable form of cooperation. It is precisely in these areas that the One Health approach finds some of its clearest practical applications.

In the Bulgarian context, the issue acquires additional significance. Given the existence of separately established systems, professional communities and regulatory mechanisms in human and veterinary medicine, the opportunities for interaction between them, the level of awareness of One Health principles, and the readiness for their practical implementation constitute a distinct public health challenge. In this respect, the dissertation's focus on the knowledge, attitudes and practices of professionals from both sectors is well justified and makes it possible to examine One Health not merely as a theoretical framework, but also in terms of the opportunities and barriers to its practical implementation.

The chosen topic is timely, socially significant, and has clear potential for practical application in the field of infection control and the containment of antimicrobial resistance.

Evaluation of the Literature Review

The literature review comprises 46 pages and systematically traces the emergence and development of the One Health concept, its fundamental principles and areas of application, infection prevention and control, antimicrobial resistance, and the regulatory and organisational mechanisms for addressing these issues. Particular attention is devoted to European policies and practices, as well as to the opportunities and limitations associated with implementing the approach in Bulgaria.

The doctoral candidate begins with the conceptual and historical foundations of One Health and traces the gradual transition from the idea of a common ground between human and veterinary

medicine to the contemporary understanding of the interdependence of human, animal and ecosystem health. The institutionalisation of the approach, the establishment of the Quadripartite alliance between WHO, FAO, WOA and UNEP, and current international frameworks for intersectoral action are presented. This section provides the necessary theoretical foundation for the subsequent discussion of infectious risks and antimicrobial resistance.

A substantial part of the review is devoted to infection prevention and control and its relationship with antimicrobial resistance. Issues concerning both human and veterinary medicine, epidemiological surveillance systems, the European regulatory and strategic framework, and opportunities for coordinated action across sectors are discussed. Attention is also given to the Bulgarian context, thus gradually linking the broader One Health framework to the specific focus of the candidate's own research.

The literature review is supported by an extensive body of evidence. A total of 350 references are included, predominantly in Latin script, comprising scientific publications, documents issued by international and European organisations, and regulatory sources. The substantial number of recent publications and documents is particularly noteworthy: 44% of all references date from 2020 onwards, with those published after 2022 predominating. This is especially important in rapidly evolving fields such as One Health and antimicrobial resistance.

The broad thematic scope is both a strength and, to some extent, a weakness of the literature review. In its first part, certain aspects of the One Health concept are discussed in excessive detail, and there is some repetition of closely related points concerning integration, intersectoral collaboration, information exchange and capacity building. A more concise analytical approach would have allowed the unresolved issues underpinning the doctoral candidate's own research to stand out more clearly.

Notwithstanding this observation, the literature review demonstrates a good command of the scientific literature and provides an adequate theoretical and factual basis for formulating the aim and objectives of the dissertation research.

Evaluation of the Aim, Objectives, Methods and Organisation of the Study

The aim of the dissertation is clearly formulated: to investigate and analyse the knowledge, attitudes and practices of healthcare professional communities regarding infection prevention and control within the context of the One Health concept. Five objectives have been defined to achieve this aim, progressing logically from an examination of the conceptual and regulatory framework to

an original empirical study involving professionals from human and veterinary medicine, and the development of a conceptual model for implementing IPC recommendations and improving policies on antimicrobial resistance. There is a clear logical relationship between the stated aim, the objectives and the subsequent organisation of the study.

The empirical study was conducted between March 2023 and September 2024 and included two main professional groups. The first group (human medicine) comprised 168 professionals from four healthcare institutions, representing a total of 26 types of clinical departments, in three regions of Northern Bulgaria (Gabrovo, Silistra and Pleven). The participating physicians, nurses and other professionals were directly involved in infection prevention and control. The second group (veterinary medicine) comprised 60 veterinarians from all 28 administrative regions of Bulgaria, all of whom were engaged in clinical practice, prevention, zoonotic disease control and activities related to antimicrobial resistance.

Two questionnaires, tailored to the specific characteristics of human and veterinary practice, were developed for the collection of primary data. The questions were subsequently organised into thematic blocks and seven analytical modules, allowing the two professional groups to be compared across common domains: IPC training and knowledge, education, availability of resources, personal protective equipment, practices, awareness of One Health, and recommendations for improvement.

Descriptive and analytical statistical methods were applied. Spearman's rank correlation was used to analyse associations, while the chi-square (χ^2) test was used to assess differences between proportions, with the level of statistical significance set at $p < 0.05$. Data analysis was performed using STATISTICA 8, and Microsoft Excel was used for graphical presentation.

The ethical aspects of the study are presented in detail. The study was approved by the Research Ethics Committee of the Medical University of Varna, and permission was obtained from the management of the participating healthcare institutions and from the Bulgarian Food Safety Agency. Participation was voluntary, with participants being duly informed and with anonymity and confidentiality ensured.

The author appropriately acknowledges the limitations of the study arising from the nature of the samples. In the human medicine group, the study covered four healthcare institutions in three regions of Northern Bulgaria; therefore, the results cannot be generalised to the country as a whole.

In the veterinary group, the geographical coverage was extended to all administrative regions of Bulgaria; however, this alone does not make the sample nationally representative.

Overall, the methodological approach is consistent with the stated aim and allows data to be obtained on the knowledge, attitudes and self-reported practices of the professional groups studied, as well as to identify areas of common concern and differences between human and veterinary medicine.

Evaluation of the Results and Discussion

The chapter presenting the original research findings and their discussion is the most extensive part of the dissertation. The results are presented consecutively for veterinary and human healthcare professionals, followed by a comparative analysis of the two professional fields. The substantial amount of data collected makes it possible to identify differences both among the individual healthcare institutions and between human and veterinary practice with regard to professional preparation, training, availability of resources, implementation of infection control measures, and awareness of the One Health concept.

Among the findings of particular public health significance is the low level of awareness of the One Health approach. In the groups studied, the majority of professionals had either not encountered or were unfamiliar with the concept, a finding observed in both human and veterinary medicine. This result reveals a gap between the recognition of One Health in international health policies and its limited penetration into the professional communities expected to participate in its practical implementation.

The observed differences in training and self-assessed preparedness in infection prevention and control are also of interest. A substantial proportion of the professionals surveyed reported a positive self-assessment of their preparedness, while at the same time a need for additional and more systematic training was identified. The findings from veterinary practice also indicate less favourable assessments regarding the availability of disinfectants and certain protective practices.

The analysis of the results extends beyond the descriptive level. Statistical comparisons and correlation analysis were performed, and the author compares the study findings with those of other research in the discussion. The author also acknowledges the limitations arising from the self-reported nature of some of the information obtained.

At the same time, the comparative analysis of human and veterinary medicine requires a degree of caution in interpretation. In constructing the common analytical modules, questions from

two different questionnaires were combined which, in some instances, are thematically related but not fully equivalent in content. It is methodologically inappropriate to directly compare factual indicators with opinions or subjective assessments. For example, the availability of personal protective equipment among human healthcare professionals is compared with its use among veterinary professionals, while personal observation of inappropriate practices in a healthcare institution is compared with an opinion as to whether such practices exist within the animal healthcare system. This limits the extent to which the observed statistical differences can, in all cases, be interpreted as direct differences between the professional groups.

In some instances, the interpretation of the survey findings is more categorical than the nature of the data allows. Respondents' answers can establish their assessments, opinions or self-reported behaviour, but do not always provide sufficient grounds for concluding that a particular practice actually exists or that a specific organisational cause has been demonstrated. This does not diminish the significance of the findings, but it does require a clear distinction between an established fact and the interpretation of subjectively reported data.

The results are presented comprehensively and in considerable detail, supported by a large number of tables and figures. In some sections, however, the graphical presentation is excessively detailed and is accompanied by extensive textual repetition of the same percentage distributions. A more concise presentation of some of the findings would improve readability and allow the main associations and results of genuine analytical significance to stand out more clearly.

Despite these observations, the study provides valuable empirical information in an area that remains insufficiently researched in Bulgaria. Of particular value is the attempt to examine the professional environments of human and veterinary medicine within a common framework and to identify shared challenges relating to infection prevention, antimicrobial resistance, and the implementation of the One Health approach.

Evaluation of the Conclusions, Contributions and Practical Recommendations

The concluding section of the dissertation presents 15 conclusions, scientific and practical contributions, recommendations for practice, and two conceptual models. The conclusions cover the main areas addressed by the study: professional preparation and training, the availability of and adherence to infection control measures, antimicrobial resistance, intersectoral interaction, and awareness of the One Health approach. To a considerable extent, they derive from the results presented and provide an overall picture of the problem areas identified.

Overall, the conclusions are consistent with the findings, although greater caution would be appropriate in some of their formulations, given the survey-based nature of the study.

The scientific contributions identified by the author relate primarily to the empirical investigation of an area that remains insufficiently studied in Bulgaria and to the comparative examination of professionals from human and veterinary medicine. A substantial contribution is the generation of original data on awareness, attitudes and practices related to infection prevention and control, antimicrobial resistance, and the One Health concept.

The scientific contributions as formulated overlap to some extent, as several of them represent different aspects of the same principal finding – the identified gaps in awareness and the differences between the professional groups. In my view, their greater significance lies in their overall value: the generation of original comparative data and the identification of specific areas for future action.

The practical orientation of the dissertation is clearly evident. Recommendations are formulated regarding training, organisation and communication, standardisation of procedures, control of antimicrobial use, the development of a culture of safety, and the strengthening of intersectoral collaboration. Some of these recommendations reflect generally accepted principles of contemporary infection prevention and control and of the One Health approach; however, linking them to the specific gaps identified in the study gives them a clear practical focus.

Based on the findings, two conceptual models are proposed: a model for integrating the One Health approach at national and institutional levels, and a process-factor model aimed at improving the effectiveness of infection prevention and control and limiting antimicrobial resistance. The first systematises the key institutional, professional and societal stakeholders and the relationships between them. The second is more closely linked to the dissertation's own findings, bringing together input factors, process and modifying factors, feedback mechanisms, and expected outcomes.

The models should be regarded as conceptual proposals that organise the identified relationships and outline possible directions for action. Their practical effectiveness was not examined in the present study and could be assessed through subsequent implementation and evaluation in real-world institutional settings.

In summary, I consider the contributions of the dissertation to be primarily of a scientific and applied nature. They consist in generating original data from two professional fields, placing

these findings within the broader One Health framework, and using them to formulate practical guidance and conceptual proposals for improved coordination across sectors.

Abstract and Publication Activity

The dissertation abstract reflects the main sections, results, conclusions and contributions of the dissertation. Four full-text publications related to the dissertation topic were published between 2023 and 2025, with the doctoral candidate listed as first author in two of them. He has also participated in national and international scientific forums on topics directly related to the subject of the dissertation.

Critical Remarks and Questions

The remarks made above relate primarily to a certain degree of excessive detail in the presentation of parts of the literature review and the results, the need for caution when interpreting self-reported data, and the limited comparability of some of the indicators derived from the two questionnaires. These observations do not alter my overall positive assessment of the dissertation.

I would like to ask the doctoral candidate the following question:

“Which of the problems identified in your study do you believe can be addressed at the institutional level, and which require a national mechanism for coordination between human medicine, veterinary medicine and the environmental sector? What would be the first realistic step towards the practical implementation of your proposed model in Bulgaria?”

Conclusion

The dissertation of Dragomir Tsvetanov Ivanov addresses a relevant and insufficiently explored public health issue in Bulgaria. The innovative nature of the topic lies in bringing together, for the first time, infection prevention and control and antimicrobial resistance with the opportunities for interaction between human and veterinary medicine within the One Health approach.

The doctoral candidate demonstrates a sound understanding of the scientific field, the ability to conduct and analyse independent empirical research, and the capacity to formulate scientific and applied conclusions and practical recommendations.

The dissertation meets the requirements of the Development of Academic Staff in the Republic of Bulgaria Act and the Regulations of the Medical University of Varna for its implementation. In view of the above, I give a positive assessment of the dissertation and recommend that the esteemed Scientific Jury award Dragomir Tsvetanov Ivanov the educational

and scientific degree “Doctor” in the Doctoral Programme “Public Health Management”,
Professional Field 7.4. Public Health.

Reviewer:

Заличено на основание чл. 5,
§1, б. „В“ от Регламент (ЕС)
2016/679

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