

## Statement

by Assoc. Prof. Vladimir Borisov Kornovski, MD, PhD

Head of the Cardiac Surgery Clinic at Heart and Brain Hospital – Burgas

Regarding a doctoral thesis for awarding the educational and scientific degree 'PHILOSOPHY DOCTOR'

**Field of Higher Education:** 7. Healthcare and Sports, 7.1. Medicine

**Scientific Speciality:** Cardiac Surgery

**Author:** Pavlin Lyubenov Manoilov, MD

**Doctoral Form:** Independent study

**Department:** Cardiovascular Surgery and Angiology, Cardiac Surgery Clinic, Medical University "Prof. Dr. Paraskev Stoyanov" – Varna

**Thesis Subject:** Epidemiology, risk factors and clinical presentation of wound infections after sternotomy. Prevention and treatment trends in the Cardiac Surgery Clinic

Research supervisor: Prof. Plamen Panayotov, MD, PhD, Department of Cardiovascular Surgery and Angiology, Medical University "Prof. Dr. Paraskev Stoyanov" – Varna

I was appointed as a member of the scientific jury for the defence of the above-mentioned doctoral thesis by Order № R-109-1/ 02.01.2025 of the Rector of the Medical University "Prof. Dr. Paraskev Stoyanov" – Varna, Prof. Dimitar Raykov, MD, DSc.

### 1. General presentation of the procedure and the doctoral candidate

The following paperwork was made available to me in both print and digital format: thesis, thesis summary, application to the Rector for initiating defence procedure, curriculum vitae, copy of Master's degree, enrolment order, protocols from doctoral minimum exams, department council protocol with a positive referral for thesis defence, a statement on the innovative nature of research, list of thesis-related publications, declaration of the authenticity of submitted documents, confirmatory statements for the presence of scientific profiles in research databases, similarity report from StrikePlagiarism.com issued by the Publishing Department, a certificate for current profile with complete list of

scientific publications in Google Scholar and ORCID issued by MU-Varna library, list of participations in scientific forums related to the thesis subject signed by the doctoral candidate.

The presented documentation meets the requirements stated by the Development of Academic Staff in the Republic of Bulgaria Act (DASRBA) and the Rules and Regulations for Academic Staff Development at the Medical University "Prof. Dr. Paraskev Stoyanov" – Varna.

Dr. Pavlin Manoilov has submitted a list of 9 presentations at scientific forums and 7 full-text publications.

## **2. Brief biographical data of the doctoral candidate**

Dr. Pavlin Lyubenov Manoilov graduated from the Medical University – Pleven in 1991. From 1991 to 1997, he worked at the City Clinic in Lyaskovets, Veliko Tarnovo region. During this time, he completed specialised training in Surgery, acquiring a certificate in Surgery in 1999. From 1997 to 1999, he worked as a surgeon at Dr. Stefan Cherkezov Regional Hospital, Veliko Tarnovo. From 2000 to 2002, Dr. Manoilov was a physician-auditor at the Regional Health Insurance Fund, Veliko Tarnovo. From 2002 to 2009, he was a surgeon at Dr. Stefan Cherkezov Regional Hospital, Veliko Tarnovo. From 2009 to 2011, he specialised in cardiac surgery at Ospedale Niguarda, Milano, Italy. In 2011, Dr. Pavlin Manoilov joined the Cardiac Surgery Clinic at St. Marina University Hospital – Varna, and since 2019 has been an assistant professor at the Department of Cardiovascular Surgery and Angiology, Medical University "Prof. Dr. Paraskev Stoyanov" – Varna.

He started his doctoral thesis research on December 15, 2022.

## **3. Relevance of the subject**

I find the thesis subject significant, particularly considering how this complication negatively impacts patients' quality of life, increased hospital stay, extra efforts on behalf of medical staff, and adverse financial impact. Understanding the factors leading to surgical wound infections after cardiac surgery, the risk factors for their occurrence, and knowledge of modern methods of prevention and treatment could contribute to reducing the frequency of wound complications and improving early and long-term postoperative results.

## **4. Knowledge of the problem**

The literature review is presented in 11 chapters, covering data on basic aspects such as pathogenesis, spread, prevention, and treatment of wound infections after cardiac surgery. The numerous risk factors for their occurrence, potential sources

of infection, antiseptic preparation of patients in pre- and post-operative periods, and the socio-economic implications are presented. There are eleven identified classifications of superficial and deep sternal infections. The different classifications are based on affected anatomical structures, clinical and paraclinical data, pathogenesis, existing risk factors, and factors attributed to bacterial agents. Data is presented on applying advanced antiseptic techniques for both prevention and infected wounds. The role of negative pressure wound therapy (NPWT) with its variants in wound treatment is presented in detail. Data is provided on the use of NPWT in preventing wound infection after cardiac surgery (ci NPWT – closed incision NPWT). The prevention methods in preoperative, intraoperative, and postoperative periods are covered in detail. In this context, I believe Dr. Manoilov has a comprehensive understanding of the multifaceted aspects of this complication and is familiar with the good practices published in the specialised literature.

## **5. Aim, tasks, and research methodology**

The thesis aims to minimise the risk of sternal wound infections after cardiac surgery and optimise the management of this serious complication through evidence-based practices and strategies. The aim is clearly defined: it emphasises prevention while not underestimating modern treatment methods. Seven specific tasks are linked directly to the stated aim. Two studies were conducted to compare the frequency of risk factors for the development of wound infection. The target group in Study 1 consists of 101 patients who developed wound complications out of 1 354 patients. In Study 2 there are 17 patients who developed wound complications out of 505 patients. The control group consists of 101 consecutive patients treated in the same clinic under the same conditions and examined for the same indicators. The study focused on 17 distinct risk factors. Study 2 was conducted after implementing a Protocol for Preventing Wound Infections in the Cardiac Surgery Clinic – Varna. It evaluates the influence of risk factors after applying the Prevention Protocol. The relative ratio of infections after cardiac surgery was compared before and after the Protocol implementation. The parameters investigated in the thesis were assessed and compiled using standard statistical methods typically utilised in medical research.

## **6. Characteristics and evaluation of the thesis and its contributions**

The thesis is presented on 133 pages, with seven main sections. The scientific hypothesis is supported by 50 tables, 24 pictures, and 2 diagrams. The bibliography consists of 335 sources, with 68 from the last 5 years. The literature review is comprehensive. The stated aim and tasks are precisely and clearly formulated. In the Results section – Studies 1 and 2, the doctoral candidate

provides statistical information about the *severity* of potential risk factors in the cardiac surgery clinic, formulating their influence before and after implementing the Protocol for Preventing Wound Infections. Additionally, the doctoral candidate presents a statistically verified reduction in the *frequency* of wound infections after implementing the Protocol. The Discussion chapter focuses on the presentation of the Protocol itself, clearly indicating its source and the achieved results after its application. The main points are presented descriptively and graphically in order to facilitate straightforward and practical implementation. The prevalent application of negative pressure therapy in treating infected wounds stands out. The initial results of applying NPWT for this complication are noteworthy. The development of this methodology is addressed within the future research guidelines suggested by the doctoral candidate. Dr. Manoilov's conclusions follow logically from the presented material, statistical analyses, and data interpretation. The result of applying the Prevention Protocol is indicated, but strict adherence to it is also emphasised. The doctoral candidate aims to implement novel products and evidence-based good surgical strategies. Three thesis contributions are presented. I accept all three contributions outlined by the author as significant. In my opinion, the contributions, as presented, effectively capture the fundamental aspects of this research.

## **7. Assessment of the thesis-related publications and the personal contribution of the doctoral candidate**

The doctoral candidate has presented 7 thesis-related publications in Bulgarian peer-reviewed journals. Dr. Manoilov is the leading author of all publications. The quantity of original and non-repeating research output related to the thesis subject meets the requirements for obtaining the educational and scientific degree of Philosophy Doctor. The personal qualities of the doctoral candidate are substantiated by the meticulous research undertaken for the thesis, the results produced, the conclusions formulated, and the presented contributions.

## **8. Thesis summary**

The thesis summary is developed on 65 pages. It is properly structured and contains the main results of the scientific research and a list of thesis-related scientific publications. It reflects in sufficient detail the results achieved and the conclusions that were formulated.

## **9. Critical remarks and recommendations**

Critical remarks:

1. Certain parts of the literature review reflect a slightly propaedeutic approach, for example: Terminology, Antiseptics, Microbiology, and Antibiotic therapy.



2. Volume of literature review – significantly exceeds the requirements according to standard criteria. This might originate from the candidate's ambition to be more all-encompassing in his research.
3. This comprehensive bibliography includes only one publication from Bulgarian authors.
4. Five cases of sternal reconstruction after post-sternotomy mediastinitis are mentioned, but details regarding the surgical technique in these cases are missing, which is of substantial interest.

## 10. Conclusion

Based on the information available up to this point, I can assert with certainty that Dr. Pavlin Lyubenov Manoilov's thesis on "Epidemiology, Risk Factors, and Clinical Presentation of Wound Infections After Sternotomy. Prevention and Treatment Trends in the Cardiac Surgery Clinic" holds high scientific and practical value. It includes all the crucial features necessary for this type of scientific work. I believe the thesis meets the requirements of the Development of Academic Staff in the Republic of Bulgaria Act (DASRBA) and the Rules and regulations for its implementation.

In light of the points discussed above, I give my positive assessment of the conducted research and propose to the honourable Scientific Jury to award the educational and scientific degree "PHILOSOPHY DOCTOR" to Dr. Pavlin Lyubenov Manoilov.

**Date:**

**29/02/2025**

**Statement by:**

**Assoc. Prof. Vladimir Kornovski, MD, PhD**

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