

## STATEMENT

by Assoc. Prof. Armine Vardani Grigoryan, MD, PhD  
 Department of Physiology and Pathophysiology  
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regarding a dissertation submitted for the award of the educational and scientific degree  
**“Doctor (PhD)”**  
 professional field **7.1. Medicine**  
 doctoral programme **“Pathological Physiology”**

**Author:** Dr. Plamena Stoyanova Lungova

**Form of doctoral training:** full-time

**Department:** Department of Pathological Physiology, Faculty of Medicine, Medical University – Plovdiv

**Dissertation title:** *“Anthropometric determinants of resistance (Rrs) and reactance (Xrs), measured by the forced oscillation technique, in children aged 2–13 years”*

**Scientific supervisor:** Prof. Blagoy Marinov, MD, PhD (Medical University – Plovdiv)

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

The submitted set of materials in hard copy and/or electronic format complies with Article 70 (1) of Section I. Acquisition of the Educational and Scientific Degree “Doctor” and the Scientific Degree “Doctor of Sciences” of the Rules and Regulations of the Medical University of Plovdiv (adopted on 28 January 2021) and includes the following documents:

- Application addressed to the Rector of the Medical University of Plovdiv for the opening of a procedure for the defense of a doctoral dissertation
- Curriculum vitae in European format, signed by the doctoral candidate
- Notarized copy of the diploma of higher education
- Orders for enrollment in the doctoral programme, interruption of studies (due to maternity leave) and resumption of training; order for expulsion with the right to defense
- Order for the conduct of the examination from the individual study plan and the corresponding protocol certifying the successful completion of the examination or the doctoral minimum in the specialty
- Minutes of the Departmental Council meeting regarding the preliminary discussion of the dissertation and the adopted decisions for opening the procedure and appointing the Scientific Jury
- Dissertation manuscript

- Abstract of the dissertation
- List of scientific publications related to the dissertation topic
- Copies of the scientific publications
- List of participations in scientific forums
- List of identified citations
- Declaration of originality and authenticity of the submitted documents
- Other documents related to the course of the procedure

In connection with the dissertation, the doctoral candidate has submitted 7 publications and has participated in 10 scientific forums.

### **Biographical information about the doctoral candidate**

Dr. Plamena Stoyanova Lungova obtained the educational qualification degree **Master of Medicine** in **2020** at the Medical University of Plovdiv. Since **2021**, she has been a full-time doctoral candidate at the Department of Pathological Physiology, Faculty of Medicine, Medical University of Plovdiv, enrolled in the doctoral programme “**Pathological Physiology**” within professional field **7.1. Medicine**. In **2025**, she obtained a medical specialty in **Pathophysiology**.

According to the submitted academic curriculum vitae, Dr. Lungova serves as an **Assistant in Pathological Physiology** at the Medical University of Plovdiv and is involved in teaching activities conducted in both Bulgarian and English. She participates in qualification courses, scientific training programmes, and international academic mobility initiatives, including **Erasmus+**, and is also a member of professional scientific organizations.

Her research activity is directly related to the topic of the dissertation, and the documents and scientific results submitted within the procedure demonstrate consistent academic development and professional training corresponding to the requirements for the award of the educational and scientific degree **Doctor (PhD)**.

### **2. Relevance of the Topic**

The dissertation topic is of substantial scientific and clinical relevance, as the assessment of respiratory function in childhood is fundamental for early diagnosis, characterization of functional impairment, and long-term monitoring of common respiratory disorders, including bronchial asthma and obstructive airway diseases. In this context, the forced oscillation technique (FOT) has emerged as a modern, non-invasive, and patient-friendly method for evaluating respiratory impedance through parameters such as resistance (Rrs) and reactance (Xrs), requiring minimal active cooperation and eliminating the need for forced respiratory manoeuvres. These characteristics make FOT particularly suitable for preschool-aged children and for patients in whom conventional spirometry is difficult to perform or provides limited reproducibility.

Beyond its practical advantages, FOT has the ability to detect early alterations in respiratory mechanics, including changes associated with peripheral airway obstruction and lung elastic

properties, which may remain underestimated by traditional pulmonary function tests. Nevertheless, the broader implementation of FOT in routine clinical practice is constrained by the lack of reliable, population-specific reference equations and cut-off values adjusted for key anthropometric determinants such as age, height, body weight, and sex. The application of reference standards derived from other populations may result in systematic bias and increase the risk of inaccurate clinical interpretation.

In this context, the present dissertation addresses a timely and clinically relevant problem by contributing to the development of population-specific reference data for Bulgarian children and by establishing a foundation for more accurate clinical interpretation, standardized follow-up, and wider application of FOT in paediatric pulmonology.

### **3. Knowledge of the Problem**

The doctoral candidate demonstrates a very good and well-systematized understanding of the current state of the research problem, presenting a thorough and critical analysis of the contemporary specialized literature. The literature review is logically structured and consistently presented, clearly reflecting the ability to synthesize, compare, and interpret scientific data from leading international sources.

The literature survey encompasses **240 references**, published predominantly in the **period 2000–2025**, including leading international guidelines, original scientific publications, and systematic reviews in the fields of pulmonology, functional diagnostics, and pediatrics. This provides a modern and reliable scientific basis for the formulation of the research concept, the interpretation of the results, and the derivation of well-grounded scientific conclusions.

### **4. Research Methodology**

The selected methodology is appropriate and fully aligned with the aim and objectives of the dissertation. The study includes **206 healthy children** aged **2-13 years**, recruited from kindergartens and primary schools in **Southern Bulgaria**, based on clearly defined inclusion and exclusion criteria. Additional analyses were performed in specific subgroups: **35 children (6-8 years)** to compare FOT parameters with spirometry, and a clinical cohort assessing deviations from reference limits - **52 children in total**, including **27 children with bronchial asthma** and **25 healthy controls**.

Modern instrumentation and statistical methods were applied in accordance with ATS/ERS recommendations, and the data were processed using appropriate analytical approaches, providing a reliable basis for valid interpretation of the results.

## 5. Characteristics and Evaluation of the Dissertation and Its Contributions

The presented dissertation comprises **143 pages** and is structured into sections typical of a doctoral research study, including a literature review, aim and objectives, materials and methods, results, discussion, conclusions, contributions, and references. The exposition is clear, terminologically precise, and logically coherent. The content is well organized and allows for a consistent follow-up of the scientific approach—from problem formulation, through methodological resolution, to interpretation of the results and synthesis of the conclusions.

The scientific value of the dissertation is primarily focused on the systematic investigation of **anthropometric determinants** of respiratory impedance parameters—**resistance (Rrs)** and **reactance (Xrs)**—measured using the forced oscillation technique in childhood, as well as on the development of **reference models and clinically applicable cut-off values**. In this context, the main scientific and applied contributions of the dissertation may be summarized as follows:

- identification of relationships between Rrs/Xrs and key anthropometric variables (age, height, body weight, and sex);
- development of reference equations and cut-off criteria for key FOT parameters;
- analysis of the comparability and interrelationships between oscillometric indices and standard spirometric parameters;
- evaluation of the applicability of FOT in children with bronchial asthma and of the method's potential for functional assessment in this clinical group.

The obtained results have clear practical relevance and provide a basis for more accurate interpretation of FOT measurements in children within the Bulgarian population, as well as for future development of the topic toward standardization and expansion of clinical applications.

## 6. Evaluation of the Publications and the Doctoral Candidate's Contribution

The results of the dissertation have been presented in **7 publications** directly related to the research topic, as well as in **10 scientific communications** reported at international and national scientific forums. The publication record reflects the doctoral candidate's consistent and leading involvement; in a substantial proportion of the publications, she is listed as the leading author, which convincingly confirms her personal contribution.

The doctoral candidate has been directly involved in all major stages of the research—study design planning, recruitment and assessment of the study cohort, data processing and statistical analysis, interpretation of the findings, and their dissemination in scientific formats. In this respect, the stated contributions and conclusions largely result from her independent work and scientific initiative.

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The methodological approach is coherent and provides a reliable basis for correct interpretation of the results. As a perspective for further development, expanding the clinical cohorts and conducting longitudinal follow-up may be recommended, which would enhance the applied value and facilitate the implementation of the method in routine clinical practice.

## 7. Dissertation Abstract

The dissertation abstract has been prepared in accordance with the applicable regulatory requirements and comprises **59 pages**. In terms of content and structure, it clearly, precisely, and systematically presents the aim, objectives, methodology, main results, and scientific contributions of the dissertation. The presentation is logically coherent and enables an objective and comprehensive assessment of the research conducted.

In conclusion, the abstract accurately reflects the dissertation and fully meets the requirements for this type of scholarly work.

## CONCLUSION

The presented dissertation contains original scientific and applied research results that contribute to the advancement of knowledge in the field of functional diagnostics of the respiratory system in childhood. The study fully complies with the requirements of the Academic Staff Development Act of the Republic of Bulgaria, the Regulations for its implementation, and the Regulations of the Medical University of Plovdiv. The submitted materials and the achieved dissertation results are in full accordance with the specific regulatory and academic requirements adopted in connection with the application of the Act at the Medical University of Plovdiv.

The dissertation convincingly demonstrates that **Dr. Plamena Stoyanova Lungova** possesses profound theoretical knowledge, solid methodological training, and well-established professional skills in the scientific specialty **“Pathological Physiology.”** Throughout the research process, the doctoral candidate has demonstrated the ability to independently formulate scientific problems, design and conduct research, critically analyze and interpret the results, and derive well-founded scientific conclusions with practical relevance.

Based on the above, I confidently express my **positive assessment** of the conducted research, as presented in the dissertation and the abstract, as well as of the achieved scientific results and formulated contributions, and I propose that the distinguished Scientific Jury award the educational and scientific degree **“Doctor (PhD)”** to **Dr. Plamena Stoyanova Lungova** in the doctoral programme **“Pathological Physiology.”**

17.02.2026

Prepared by: .....  
**Assoc. Prof. Armine Vardani Grigoryan, MD, PhD**

Заличено на основание  
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