

REVIEW

By Prof. Dr. Krasimira B. Yaneva-Ribagina, DMD, PhD

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(retired 4 years ago)

External member of the scientific jury appointed by Order № R-5631 dated 30.09.2026 of the
Rector of Medical University – Plovdiv, regarding the dissertation for the award of the
Educational and Scientific Degree " **PhD** "

Field of Higher Education: 7. Healthcare and Sports

Professional Field: 7.1. Medicine

Doctoral Program: Social Medicine and Organization of Healthcare and Pharmacy

Form of Study: Full-time

Department: Social Medicine and Public Health, Faculty of Public Health, Medical University
– Plovdiv

Author: Dr. Ivelina Tenkova Popova-Sotirova

Topic: Models for Pricing and Payment of Outpatient Dental Care Services

Academic Supervisors: Prof. Nina Musurlieva, DMD, PhD, and Prof. Ralitsa Raycheva, MD,
PhD

1. General overview of the procedure and the candidate

The submitted set of materials (in electronic format) complies with the requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria (ADASRB), the Regulations for its implementation, and the internal regulations of MU-Plovdiv. The documentation is structured and aligned with the regulatory criteria for the procedure of awarding the Educational and Scientific Degree **PhD**. No procedural irregularities were found.

Dr. Ivelina Sotirova was enrolled in a full-time PhD program by Order № R-1933/03.07.2023 of the Rector of MU-Plovdiv for a period of three years at the Department of Social Medicine and Public Health (SMPH) within the Faculty of Public Health at MU-Plovdiv. The dissertation thesis was discussed at an expanded Department Council meeting (Protocol № 20/29.06.2026), approved by the Faculty Council (Protocol № 8/14.07.2026), and scheduled for public defense on 19.11.2026.

2. Brief biographical data of the PhD candidate

Ivelina Tenkova Popova-Sotirova graduated from the Faculty of Stomatology at the Medical University of Plovdiv in 1992. She began her career as a dental practitioner in 1996 at the Outpatient Dental Clinic in the town of Karlovo. In 1996, she established her own private dental practice in Plovdiv. On April 1, 2022, following a successful competitive examination, she was appointed as an Assistant Professor at the Department of Social Medicine and Public Health within the Faculty of Public Health at the Medical University of Plovdiv. In 2025, she acquired the specialty of "Dental Public Health."

Her extensive clinical experience evidently brought her into contact with the challenges of dental healthcare, incl. financing issues, that motivated her to develop a research topic focused on the financing of dental services.

3. Relevance of the Issue

Dental services fall primarily within the scope of outpatient medical care, and their financing comes from three main sources: the National Health Insurance Fund (NHIF), health insurance funds, and private (out-of-pocket) payments. This financing structure creates difficulties in determining the cost of the services provided.

Accurately determining the cost of medical services, incl. dental services, has always been a significant and challenging objective due to the multiple of influencing factors: health and economic policies, the population's demographic and health profile, regional characteristics, and the specific nature of the medical procedures.

In the current conditions of our country, dental care suffers from systemic underfunding; public expenditure on dental services is less than 2% of the total healthcare budget - one of the lowest rates in the EU. Consequently, the prices for dental procedures agreed between the National Health Insurance Fund (NHIF) and the Bulgarian Dental Association (BgDA) fall below the actual cost of the services, creating a financial risk for dental practices.

Today's healthcare system is evolving rapidly amidst limited public resources; this, combined with rising patient expectations for rapid access and high-quality care, necessitates a new model for pricing dental services - one that reflects the true value of the service while aligning with quality, long-term outcomes, and financial logic. These factors render the present dissertation both timely and strategically essential.

4. Analysis of the Dissertation

The dissertation comprises 190 pages and is structured into 11 chapters: Literature Review, Materials and Methods, Results and Discussion, Financing of Dental Care within the Public Health System, Modeling a Methodology for Effective Pricing and Remuneration in Dental Practice, Findings, Conclusion, Recommendations, Contributions, Bibliography, and Appendices. The work is illustrated with 18 tables and 29 figures.

The Literature review analyzes 93 sources, comprising 70 publications from the global literature (12 in Bulgarian and 59 in languages using the Latin script), 11 regulatory documents, and 12 internet sources. The scientific publications are actual, with 70% (49) having been published between 2015 and 2025.

The review describes the nature and characteristics of outpatient dental care, healthcare financing models in Bulgaria, and dental service pricing and payment mechanisms; it also presents a comparative analysis of pricing and payment practices in dentistry in Germany, France, Sweden, and Poland.

The conclusions drawn from the literature review - particularly regarding the identified weaknesses and challenges of our healthcare system - demonstrate the need to create a new model for valuing dental procedures. This leads logically to the ***Study's aim***: To develop and empirically validate an innovative model for the pricing and reimbursement of outpatient dental services - one that reflects actual treatment expenditures, service quality characteristics, and the expectations of key stakeholders, namely dentists and patients.

The ***"Materials and Methods" chapter*** defines the aim, tasks, scientific hypothesis and research hypotheses, the object of study, the units of observation and their characteristics, and the research methods.

Six main tasks have been established to achieve the aim. The scientific hypothesis to be tested is that "There exists a method of financing dental care that would enhance the efficiency and transparency of dental service pricing and increase the satisfaction of key system stakeholders".

The methods used in the study are sociological methods (surveys), economic analysis, and statistical methods (descriptive and graphical analysis). Primary data processing and analysis were performed using the IBM SPSS Statistics v.26 software package.

The research conducted in the dissertation was approved by the Ethics Committee of the Medical University of Plovdiv (Opinion № R-KNE-46, dated April 14, 2026).

Chapter: Results and Discussion

After systematizing existing dental practice financing models and analyzing international best practices, the candidate identifies the key shortcomings of the dental care financing system in Bulgaria through inquiries conducted among patients and dentists.

The inquiries involved participants from four major urban centers in Bulgaria - Plovdiv, Sofia, Varna, and Burgas, where the majority of dental practices are concentrated. Patients (202 individuals) were selected randomly, with invitations to participate issued via the Internet and social media. Dentists (83 practitioners) were invited to participate through professional networks and the regional comities of the Bulgarian Dental Association (BgDA).

The patient questionnaire consists of 29 closed-ended questions, while the one for dentists comprises 25. Both surveys contain two sets of questions: one covering the respondents' demographic characteristics (gender, age, education, place of residence) and another addressing their attitudes, opinions, and views regarding the financing and payment for dental services.

More than half of the surveyed patients (55%) state that the cost of dental services is unaffordable for them; only 15% have received a written treatment plan for more expensive

procedures; 35% were not informed of the treatment cost in advance; and 80% support the idea of digitizing the pricing process.

An analysis of the relationship between patients' demographic characteristics (gender, age, education level, and place of residence) and their assessments of price transparency and the affordability of dental services reveals that younger individuals, those with a secondary education, and urban residents feel better informed about the financial aspects of dental treatment.

The majority of dentists (88%) consider the prices set by the National Health Insurance Fund (NHIF) to be inadequate; 69.9% believe the current financing model is ineffective; nearly 80% support the introduction of a new payment model that accounts for actual expenditures and incentivizes treatment quality; 85.5% support the digitalization of reporting; and 95.2% endorse the need for transparency in pricing.

Differences in the opinions and attitudes of dentists based on their demographic characteristics are also evident here. Younger dentists with less professional experience are more enthusiastic about innovations in pricing and remuneration for their services, whereas their older colleagues tend to be more skeptical and prefer established payment methods.

Findings from the two surveys - conducted among dentists and patients - highlight deficiencies in the funding of dental services, specifically resource shortages, a lack of transparency, and the need for a new funding model.

Based on an analysis of the current state of dental service funding via the National Health Insurance Fund (NHIF), healthcare sector pricing methods, funding disparities compared to other EU countries, and the survey findings, the doctoral candidate concludes that a new method for financing dental care must be developed.

By analyzing in detail the factors influencing pricing, Dr. Popova has developed a conceptual framework for the economic value of dental services, encompassing the necessary resources, the clinical characteristics of procedures, treatment quality, and the specific features of the social and regulatory environment. This framework consists of a system of five interconnected components that shape the service's economic value.

The first component comprises the clinical characteristics of the service: type, complexity, duration, technologies employed, required professional competencies, and potential clinical risk. **The second component** covers the resources required for service delivery, such as costs for materials, labor, equipment, depreciation, and administrative expenses. **The third component** includes service quality indicators reflecting treatment effectiveness, patient safety, the incidence of complications, the need for repeat interventions, and patient satisfaction. **The fourth component (external environment)** represents the socio-regulatory environment, comprising factors that determine the service's societal significance, regional specificities, the accessibility of dental care, and health policy priorities - namely national health policy, the National Health Insurance Fund (NHIF) and other payers, legislation, the market environment, demographic characteristics, and others. **The fifth component** encompasses stakeholder value, which includes patient benefits, the economic sustainability of

the dental practice, and the efficiency of public funding. Thus, pricing is presented as a process of integrating clinical, economic, quality-related, and societal factors.

To enable the framework to serve as a pricing tool, it has been converted into measurable quantitative indicators. Each component is transformed into measurable quantitative metrics that are subsequently standardized, aggregated into a composite index, and incorporated as distinct elements within the quantitative model. The quantitative model comprises four main components: a **base value** (the clinical cost of the dental procedure), a **professional resource component** (represented by a labor index), a **quality component** (standardized indicators for clinical outcomes, safety, and patient assessment), and a **regional and systemic component** (accounting for variations in the economic, social, and regulatory environment).

The quantitative model is subject to empirical validation prior to practical application in order to assess the reliability of its individual components and the accuracy with which it reflects the characteristics of dental practice.

The author has proposed a detailed theoretical protocol for the empirical application of the model - specifically as a pilot test and initial calibration rather than a definitive normative validation. Full implementation of the model would require representative data from a larger number of dental practices, the participation of various stakeholders, and verification of the results across different regional settings.

The dissertation ***Concludes*** with a summary of the findings. The author offers ***Recommendations*** to the institutions involved in dental care financing - the Ministry of Health, the National Health Insurance Fund (NHIF), and the Bulgarian Dental Association, as well as to dental practitioners, urging a collaborative effort to establish an effective financing system for dental services.

5. Contributions and significance of the dissertation

I accept the contributions derived from the obtained results and conclusions. These are classified as both scientific-theoretical and practical-applied in nature. I would identify the creation of a new financing model for outpatient dental care - integrating the clinical, economic, quality-related, and societal factors that influence pricing - as the most significant contribution. The author has also proposed a methodological framework for the empirical application and validation of the model regarding the pricing of dental services.

6. Abstract

The abstract is 45 pages long and is structured in accordance with the requirements. It presents the main sections of the dissertation in a condensed format. The abstract provides a clear overview of the content, methodology, and key results of the dissertation.

7. Assessment of publications related to the dissertation

The PhD candidate has presented 5 publications related to the dissertation topic: 2 articles and 3 conference presentations. She is the leading author on 3 of the publications and the second author on 2, which demonstrates her personal contribution. The publications

represent a portion of the results from her research. The number and quality of the publications meet the requirements of Medical University – Plovdiv for the public defense.

8. Personal contribution of the doctoral candidate

The dissertation is the personal work of the doctoral candidate.

9. Critical remarks and recommendations

I have no critical remarks regarding the work. I would recommend that the doctoral candidate continue working on the topic in order to achieve practical application of the model she developed within the dental care network.

10. Personal impressions of the doctoral candidate

I do not know Dr. Ivelina Popova-Sotirova personally, and my impressions are based on the submitted dissertation, the abstract, and the accompanying materials. My overall impression of her work is positive: the dissertation is written in clear, correct language, demonstrating a good knowledge of the subject matter, the structure is coherent and logical, and the conclusions and contributions are well-formulated.

CONCLUSION

The dissertation titled "Models for Pricing and Payment of Outpatient Dental Care Services" by Dr. Ivelina Tenkova Popova-Sotirova is properly structured and contains theoretical and applied scientific results that meet the requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for its implementation, and the relevant Regulations of the Medical University of Plovdiv regarding the conferral of the educational and scientific degree of PhD.

The dissertation demonstrates that the doctoral candidate possesses theoretical knowledge and practical skills in the subject area and shows the ability to independently conduct, analyze and describe scientific research.

Based on the foregoing, as a member of the scientific jury, I provide a positive assessment of the dissertation and propose that the esteemed jury confer the educational and scientific degree of PhD upon Dr. Ivelina Tenkova Popova-Sotirova in the doctoral program "Social Medicine and Organization of Healthcare and Pharmacy."

Oct 15, 2026

REVIEWER:

Prof. Krasimira B. Yaneva-Ribagina, DMD, PhD

