

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF PUBLIC HEALTH
Department of "Social Medicine and Public Health"

Dr. Ivelina Tenkova Popova-Sotirova

**Pricing and Payment Models for the Activities in Outpatient Dental
Care**

ABSTRACT
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Scientific advisors: Prof. Dr. Nina Musurlieva, PhD
Prof. Ralitsa Raycheva, PhD

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1. INTRODUCTION

In the contemporary context of transforming health systems, increasing digitalization, demographic challenges, and social sensitivity toward inequities in access to health services, the problem of adequate pricing and payment for medical activities has become particularly acute. One of the most critical yet simultaneously underestimated segments in this context is outpatient dental care, which bears a significant part of the population's health care burden, while at the same time suffering from systemic underfunding, unclear pricing mechanisms, and the lack of a sustainable economic model of operation. Dental medicine in Bulgaria is organized predominantly within the framework of outpatient care, provided by individual and group practices that operate under contract with the National Health Insurance Fund (NHIF), with health funds, or in the free market. This three-way structure gives rise to numerous tensions, particularly in determining the value of the services provided. Despite reform efforts, the current payment mechanism is often based on outdated, non-indexed prices, administratively fixed values, and an incomplete correspondence between the actual cost, clinical complexity, and expected quality. This leads to economic instability for providers, dissatisfaction among patients, and a limited capacity for strategic planning of the system.

The growing demands of patients related to rapid access, high quality, and an individualized approach require a new philosophy in the organization of dental care - one in which the financial model is not merely administered, but purposefully structured so as to reflect the actual value, the added benefit to the patient, and the professional's engagement. Under current practice there is no link between quality and remuneration, or between long-term outcomes and short-term financial logic, which hinders both innovation and investment in human and technological resources. Against this backdrop, the need to build a scientifically grounded, transparent, and flexible model for pricing and paying for dental activities is not only topical but also strategically imperative. It stems not so much from a regulatory deficit as from a systemic inability to connect economic logic with social responsibility and professional reality. Under conditions of limited public resources and market fragmentation, dental practice is often placed in the position of a compromise between sustainability and accessibility - a dilemma that cannot be resolved without serious scientific analysis and modeling.

The present dissertation places precisely this problem at the center of its research - how to structure pricing and payment models in dental care that are simultaneously objective, effective, and accepted by the stakeholders. The study is not limited to an economic framework but examines the issue in its full complexity: the interaction between regulation, market logic, social attitudes, professional expectations, and actual clinical processes. This includes both an assessment of the existing situation and the creation of an innovative model, along with its empirical validation through the opinions and perceptions of patients and dental practitioners.

The topicality of the subject is further underscored by the ongoing reform processes in the health insurance system, the growing interest in *Value-Based Healthcare*, as well

as the increasing role of the patient as an informed participant in the health system. The combination of these elements places the task within the realm of interdisciplinary research - spanning health economics, public administration, health ethics, and organizational management. In this context, the present work offers not only an academic contribution but also the potential for real applicability in dental care management policies and practices. The developed model aims to create a new paradigm in which transparency, efficiency, and social sensitivity are combined into a sustainable and applicable system that takes into account the needs of both the patient and the professional.

2. AIMS, OBJECTIVES OF THE STUDY AND WORKING HYPOTHESES

Aim of the study

The main aim of the dissertation is to develop and empirically validate an innovative model for pricing and payment of dental activities in outpatient care, one that reflects the actual costs, the qualitative characteristics of the services, and the expectations of the main stakeholders - dental practitioners and patients. The model must be applicable within the Bulgarian context and meet the requirements for transparency, predictability, and economic sustainability.

Objectives of the study

1. To systematize the theoretical framework of existing financing and payment models in dental care.
2. To analyze good international practices and their applicability under Bulgarian conditions.
3. To identify the main deficits of the current pricing and payment system through a survey among patients and dental practitioners.
4. To analyze the dynamics of health insurance payments and expenditures for dental care in Bulgaria (2019-2025).
5. To develop an economically justified and practically applicable model incorporating various cost components, labor complexity, and quality indicators.
6. To validate the model by comparing hypothetical results with the actual perceptions of the participants in the system.

3. WORKING HYPOTHESES OF THE DISSERTATION

Scientific hypothesis

There is a possibility of creating and implementing a model for pricing and payment in outpatient dental care that increases the efficiency, transparency, and satisfaction of the main participants in the system by combining economic logic with social responsibility.

Sub-hypotheses

- Patients are not satisfied with the degree of comprehensibility and justification of dental service prices.
- Dental practitioners believe that the existing payment models do not cover their actual costs and efforts.
- Patients demonstrate a willingness to pay for a more transparently structured service, given adequate justification of price and quality.
- Dental practitioners support the implementation of a model in which quality, complexity, and actual resources are reflected in the remuneration for their work.

4. MATERIALS AND METHODS

Object of the study

The object of the present dissertation research is the system of outpatient dental care in the Republic of Bulgaria, considered within its economic, organizational, and regulatory context. The study focuses on the financing, pricing, and payment mechanisms for dental activities provided by private practitioners in dental medicine, working under contractual relations with the NHIF, voluntary health insurance funds, or in the free market.

Subject of the study

The subject of the dissertation is the economic models and practical mechanisms for determining the prices and remuneration for dental care activities. Particular emphasis is placed on the existing discrepancies between the costs of performing dental interventions and their actual payment, on the perceptions of the participants in the system, and on the potential for creating a model that combines economic rationality, quality of service, and social justice.

Units of observation

The units of observation are the carriers of the information on which the empirical data are collected:

- Dental practitioners practicing in outpatient care
- Patients using dental services

Observed characteristics (variables)

1. Factor characteristics (independent variables)

These are the variables that explain or influence attitudes and assessments:

For patients:

- Socio-demographic characteristics: age, gender, education, income
- Behavioral characteristics: frequency of dental visits, type of services used
- Informational factors: degree of awareness of pricing
- Assessment of: price transparency, trust in the dental practitioner

For dental practitioners:

- Professional characteristics: length of service, specialization, type of practice (individual/group)
- Economic factors: cost structure, sources of financing (NHIF, private payments, etc.)
- Organizational factors: volume of activity, types of services performed

2. Outcome characteristics (dependent variables)

These are the variables explained through the factor characteristics:

For patients:

- Satisfaction with: service prices, transparency of pricing, quality of service
- Willingness to pay: for a more clearly structured price, for guaranteed quality

For dental practitioners:

- Assessment of: the adequacy of current payment, the correspondence between costs and revenues
- Support for the new model: degree of acceptance of the proposed system
- Perception of: fairness, economic sustainability

Survey administrators

All surveys were conducted with the personal participation of the doctoral candidate under the guidance of the scientific advisors.

Methodology and research instruments

The study's methodology combines qualitative and quantitative approaches. In the theoretical part, a documentary method is applied for analyzing the regulatory framework, systematizing existing financing models in dental medicine, as well as a comparative analysis of good international practices.

Sociological methods**Survey method**

The empirical study is based on a purposefully selected sample from two key target groups - patients and dental practitioners - who represent the main parties in the process of providing, consuming, and evaluating dental care. The survey covered a total of 202 patients and 83 dental practitioners, with the selection of respondents taking into account regional and professional pluralism. Participants were engaged from four major urbanized centers in Bulgaria - Sofia, Plovdiv, Varna, and Burgas - which ensures representativeness with regard to the major economic and social hubs where a significant share of dental activity is concentrated.

Patients were selected on a voluntary basis through an invitation to participate distributed via email and social media channels, seeking various demographic profiles - by age, gender, education, and frequency of dental visits - in order to reflect the diversity of attitudes and experiences of dental service users.

Dental practitioners were invited to participate through professional networks and regional representations of the Bulgarian Dental Association, with the aim of including specialists with varying length of service, form of practice (individual, group, working with or without a contract with the NHIF), as well as attitudes toward digitalization and changes in the remuneration system.

The study was conducted during the period from October 1 to December 31, 2024, entirely in electronic form, which facilitated data processing, increased the degree of standardization, and reduced the risk of subjective influence during data collection. The sample is sufficient for conducting descriptive and inferential analysis, taking into account the limitations of resources and methodology of the study, while at the same time allowing for reliable interpretation of trends within the target groups.

The present empirical study is based on the survey method, which allows for the systematic collection, structuring, and analysis of opinions, attitudes, and perceptions of the two key stakeholders on the topic - patients and dental practitioners. The questionnaires were independently constructed based on a preliminary analysis of the problem areas outlined in the theoretical and modeling part of the study (Chapter Two), while also reflecting the research hypotheses set forth, related to satisfaction, awareness, willingness to accept a new pricing model, and the assessment of current payment mechanisms.

Patient questionnaire

The questionnaire directed at patients is structured into several logically connected sections, covering both demographic characteristics (gender, age, education, place of residence) and behavioral and evaluative indicators. In its initial version, the questions focused on the frequency of visits to a dental practitioner, awareness of the package of activities under the National Framework Contract (NFC), satisfaction with access to, and the content of this package, as well as the need for its expansion (including through specific activities such as root canal treatment, orthodontics for children, etc.).

With a view to deepening the analysis, the questionnaire was expanded with an additional thematic module comprising 10 new questions, specifically aimed at the perception of pricing transparency, willingness to pay extra given clarity and accountability, as well as trust in the new model, based on an objective cost structure and quality incentives. These questions were formulated using Likert scales in order to capture the degree of agreement/disagreement and allow for subsequent quantitative analysis - including the calculation of means, standard deviations, correlation dependencies, and regression models.

Dental practitioner questionnaire

The questionnaire directed at dental practitioners was developed with a specific focus on assessing the existing payment system, the effectiveness of regulation, the perceived economic adequacy of prices, as well as attitudes toward innovation, digitalization, and new remuneration models.

Its main body includes questions regarding:

- Length of service and form of practice (individual/group, working with/without the NHIF)
- Assessment of the realism of prices set by the state;
- Obstacles in providing services under the NFC;
- Attitude toward linking payment to clinical outcomes and quality.

Additionally, the expanded version of the questionnaire also includes 10 new questions aimed at:

- Support for *value-based pricing*;
- Willingness to introduce labor coefficients and objective norms;
- Attitudes toward digital reporting and electronic tracking of clinical outcomes;
- Evaluation of the model from the standpoint of fairness and motivation.

Sample additional questions:

- "Do you believe that including quality bonuses will improve practitioners' motivation?"
- "Do you support the use of a standardized formula for calculating the price of a procedure (e.g., labor + materials + depreciation + administrative coefficient)?"
- "Would you use an electronic reporting system if it facilitated communication with the NHIF?"
- "Do you believe that the current payment system devalues your work?"

The survey conducted in the present study provides a broad, valid, and reliable empirical basis on which the testing of the research hypotheses is built, as well as the assessment of the applicability and acceptability of the proposed model for pricing and payment in outpatient dental care.

Economic analysis

The economic analysis in the present study is based on a retrospective descriptive-analytical approach for assessing the dynamics of health insurance payments and expenditures for dental care in Bulgaria for the period 2019-2025. The analysis covers both the pediatric population (under 18 years of age) and adult patients (18 years and older), with an emphasis on the differences in financing structure between the (NHIF) and patient co-payments.

The primary data were extracted from publicly available annual reports and official statistical documents of the NHIF, as well as from the current regulatory framework governing the financing of dental care in Bulgaria. The doctoral candidate was denied

access to public information regarding the regional distribution of dental care activities for the period 2019-2024 (see Appendices).

The analysis includes:

- the total annual expenditures of the NHIF;
- the total annual expenditures for dental care;
- NHIF payments and patient co-payments for basic dental activities;
- the relative share of dental care expenditures relative to total health insurance expenditures.

For the purposes of the economic analysis, the following were used:

- absolute values of expenditures (in BGN);
- relative shares (%);
- analysis of expenditure dynamics;
- trend analysis;
- analysis of relative and absolute changes over time.

For assessing predictability and trends in expenditures, the following were applied:

- trend analysis;
- simple linear regression analysis;
- analysis of the coefficient of determination (R^2).

The linear regression model was used to assess:

- the direction of the change in expenditures;
- the magnitude of the changes;
- the sustainability and predictability of the trends over time.

Statistical methods

The systematization, processing, and analysis of the primary data in the form of quantitative and qualitative variables were carried out using the statistical package **IBM SPSS Statistics v.26**. For all statistical tests, a level of statistical significance of $\alpha < 0.05$ was adopted. The analysis, conclusions, and recommendations of the study were derived following a summarized presentation of the empirical results in tabular form and through the corresponding graphical visualizations. The graphical analysis was carried out in the MS Office 365 environment using Excel.

Opinion of the Research Ethics Committee

The scientific research conducted within the dissertation was approved by the Research Ethics Committee of the Medical University - Plovdiv, with opinion No. R-kne-46/14.04.2026.

5. RESULTS AND DISCUSSION

5.1 Results from the patient survey

Demographic profile

The survey covers 202 patients, whose demographic indicators - age, gender, education, and place of residence - were analyzed.

Age of patients

The median age is 50 years (range: 18-82 years). The largest group is that of patients aged 50-70 years, at 39.6% (n=80), followed by the 30-50 age group (n=70; 34.7%). Younger patients under 30 years of age make up 14.9% (n=30), while the oldest patients over 70 years of age account for n=22; 10.9%. This shows that the sample is relatively aging, with a concentration in the middle-aged and older patient groups.

Gender distribution

Of the 202 patients surveyed, the relative share of women is higher. Women number 122 (60.4%), and men - 80 (39.6%). This ratio (approximately 3:2 in favor of women) is characteristic of many medical studies, where women are often more inclined to seek medical care or to participate in surveys. The observed predominance of women among the patients may be due to the specifics of the sample or to women's higher engagement with health care. Nevertheless, subsequent analyses will examine whether gender is statistically significantly related to other demographic characteristics (e.g., education, place of residence) or to health outcomes.

Education

The analysis of educational level shows that the patients have a diverse educational profile, with the majority having secondary or higher education. There are 60 people (30%) with higher education, 100 people (50%) with secondary education, and 42 people (20%) with primary education or lower.

It is notable that about 80% of patients have at least a secondary education, which suggests a comparatively good level of education within the sample. The share of those with higher education (30%) is also not small, which may be relevant when assessing their health literacy and behavior. Patients with a lower educational level (primary education or none) are a minority (1/5 of the total).

Place of residence

With regard to place of residence, patients are divided mainly into two categories: urban and rural population. The data show that the majority of patients live in urban areas - 130 people (64%), while 72 people (36%) are from villages or small settlements. This ratio (2:1 in favor of the urban population) reflects, to some extent, the urbanized structure of the health care network - patients from villages are fewer and likely travel to towns for treatment. This may be due to the fact that the survey was conducted at healthcare facilities located in towns, or that access to health services is

easier for urban residents. It is also possible that the average age of rural patients is higher (since older people often remain in villages).

The study of the demographic characteristics of the 202 patients reveals several key facts:

1. The sample has an average age of around 50 years, with patients between 50 and 70 years of age being the most numerous. The group of young patients (<30 years) is relatively small, and the oldest patients (>70 years) also represent a small share.
2. There is a predominance of women (60%) over men (40%) in the sample.
3. The educational profile shows that half of the patients have secondary education, a significant proportion have higher education, and about one-fifth have primary education or lower.
4. Urban residents make up about two-thirds of the sample, and rural residents - one-third.

The results obtained show a moderately positive assessment of pricing transparency. The average rating for price clarity is 3.44 ± 1.31 , while only 40% of respondents receive advance information about the cost of treatment. The lowest rating is given to the practice of providing a written plan for more expensive treatment (2.35 ± 1.14), which indicates a need to improve patient awareness.

With regard to the comprehensibility of prices, the highest rating is given to the statement that prices are explained in an accessible and understandable manner (3.71 ± 1.31). Financial affordability remains the most problematic aspect, with an average rating of 2.54 ± 1.38 .

About 80% of patients support measures to increase transparency and digitalization of the processes, and 60% indicate that cost transparency increases their trust in the dental service.

Statistically significant differences were found with regard to age and education ($p < 0.05$). Younger patients demonstrate a better understanding of pricing information, while individuals with higher education show greater awareness of and a more critical attitude toward price transparency.

The correlation analysis establishes a strong positive relationship between the comprehensibility of pricing and trust ($r = 0.72$), as well as between trust and willingness to pay ($r = 0.63$). The multiple regression analysis shows that the model explains approximately 50% of the variation in willingness to pay ($R^2 = 0.50$), with trust in the system being the strongest predictor ($\beta = 0.50$; $p < 0.001$).

The results obtained confirm that transparency, clear communication, and digitalization are key factors for increasing trust and the acceptance of new pricing models in outpatient dental care.

5.2 Results from the survey among dental practitioners

The survey involved 83 dental practitioners. Women represent 72.3% of the sample, and men - 27.7%. Practitioners with up to 10 years of experience predominate, with 64% being general practitioners without a specialization and 36% holding a specialization. The most common form of practicing the profession is individual practice (51%), followed by work in dental clinics (29%) and group practices (20%).

The results show a high degree of dissatisfaction with the current financing model. Over 80% of respondents are dissatisfied with the remuneration received through the NHIF, and 88% believe that current prices do not cover the actual costs of providing dental services.

There is strong support for the introduction of a new payment model based on cost justification and the quality of the services provided. Close to 80% of practitioners support such a reform, with an average rating of support for the new model of 4.22 ± 0.94 .

High support is also given to measures related to transparency and digitalization of the system. The need for greater transparency in price formation receives the highest rating (4.66 ± 0.63), followed by the digitalization of reporting (4.33 ± 0.88). Support for introducing financial incentives linked to the quality of treatment is expressed by about 70% of participants (Mean = 4.00 ± 1.07).

The cross-analysis shows a statistically significant relationship between professional experience and attitudes toward innovation ($p < 0.05$). Younger practitioners demonstrate higher support for digitalization and quality-incentive mechanisms compared to practitioners with longer professional experience.

The data show a clearly expressed willingness on the part of the professional community to introduce more transparent and economically justified financing mechanisms.

5.3 Analysis of the dynamics of public financing of dental care in Bulgaria (2019-2025)

The analysis conducted shows a sustained upward trend in both total health insurance payments and the funds allocated to dental care. Total expenditures increased from BGN 4.12 billion in 2019 to BGN 8.87 billion in 2025, while financing for dental care increased from BGN 167 million to BGN 416 million over the same period. The regression analysis establishes a strong linear relationship and a high predictability of the trend, confirming the sustained growth of public investment. The relative share of dental care expenditures in the total NHIF budget increased from 4.05% in 2019 to 4.69% in 2025, indicating a gradual strengthening of the importance of oral health within national health policy.

The analysis of financed activities shows substantial differences between age groups. For persons under 18 years of age, a model of almost complete public financing of basic dental activities is applied, with patient co-payments being minimal or absent.

For adult patients, a co-financing model is observed, in which the level of public participation grows faster than the fixed patient co-payments.

Of particular significance is the introduction of full financing of prosthetic treatment for fully edentulous persons aged 65-69, which demonstrates the system's social orientation toward vulnerable population groups.

The results obtained show that during the period 2019-2025 there was a sustained expansion of public financing of dental care. Despite the positive trend, the share of funds allocated to oral health remains relatively limited, which justifies the need to develop more effective models for the valuation and financing of dental activities.

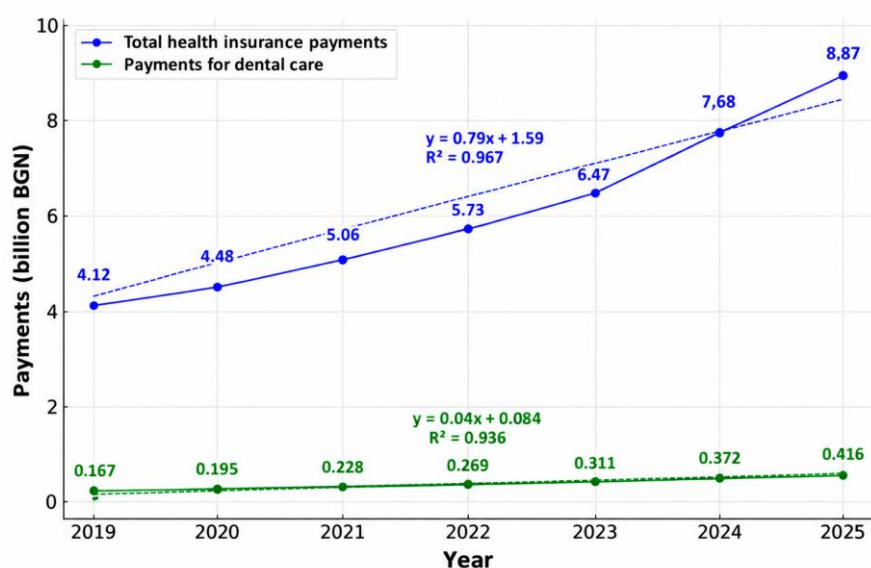


Figure 1. Dynamics of total health insurance payments and payments for dental care in Bulgaria for the period 2019-2025.

Figure 1 shows a sustained upward trend in both total health insurance payments and the funds allocated to dental care. For the period 2019-2025, total expenditures increased from BGN 4.12 billion to BGN 8.87 billion, while financing for dental care increased from BGN 167 million to BGN 416 million. The high values of the coefficient of determination ($R^2=0.967$ and $R^2=0.936$) confirm the presence of a stable and predictable upward trend.

5.4 Conceptual framework for integrated pricing and economic remuneration in outpatient dental care

Need for developing a conceptual framework

The development of health systems in recent decades has been associated with a gradual shift away from financing models based solely on the reimbursement of costs incurred or the volume of activities provided, toward mechanisms that take into account the quality of medical care, the health outcomes achieved, and the efficiency of the use of public resources. This transformation is particularly evident in areas where

mixed public and private financing predominates, as is the case with outpatient dental care.

The current mechanism for determining the value of dental activities in Bulgaria is characterized by a number of structural limitations. Among these, the following stand out: the insufficient link between the actual cost of services and their remuneration, the absence of mechanisms for incentivizing quality, the limited accounting for the clinical complexity of procedures, and the lack of adaptation to regional economic differences and the social characteristics of the population served. As a result, imbalances are formed between the resources needed to provide quality dental care and the actual financial incentives for ensuring it.

These circumstances necessitate the development of a conceptual framework that integrates the economic, clinical, organizational, and social factors involved in forming the price of dental services. The purpose of such a framework is not to propose a final mathematical pricing model, but to systematize the main components and the relationships between them that should be taken into account when developing future remuneration mechanisms.

The proposed conceptual framework represents an original methodological construct for analyzing the pricing process. It integrates the principles of cost-based pricing, value-based healthcare, relative value assessment of professional labor, and quality-incentive mechanisms into a single logical system that can be adapted to different models of public and private financing.

Architecture of the conceptual framework

The proposed conceptual framework is built as a system of interrelated components that successively form the economic valuation of the dental service. At the core of the framework lies the understanding that the final value of any dental intervention is formed under the influence of five interacting domains.

The first domain covers the clinical characteristics of the service provided. These include the type of procedure, its therapeutic complexity, its duration, the technologies used, the required professional competencies, and the potential clinical risk.

The second domain includes the economic resources required to provide the respective service. These include the costs of materials, human labor, equipment, depreciation, administrative services, and other organizational resources.

The third domain is the quality of the care provided. It is viewed as an integral characteristic of clinical activity and includes indicators related to treatment effectiveness, patient safety, the frequency of complications, repeat interventions, and patient satisfaction.

The fourth domain represents the socio-regulatory environment, which includes the factors determining the social significance of the service, regional characteristics, the accessibility of dental care, and health policy priorities.

The final domain combines the value for stakeholders, which simultaneously includes the benefit to the patient, the economic sustainability of the dental practice, and the efficiency of public financing.

The interaction between these five domains forms the logical structure of the conceptual framework and shows that the economic value of dental care cannot be determined through a single indicator, but is the result of the integration of multiple interdependent factors.

Logic of the conceptual framework's functioning

The conceptual framework treats the pricing process as a sequence of analytical stages.

Initially, the clinical characteristics of the specific intervention are identified, which determine the required professional and technological resources. Next, an assessment is made of the economic resources needed to carry out the procedure, and its clinical cost is determined.

At the next stage, this value is interpreted through the lens of the quality of care provided. High quality increases the social value of the service, while inadequate outcomes reduce its effectiveness regardless of the resources used.

The external environment is not a separate or final stage of the process, but a framing component that influences all other elements of the conceptual framework. Regulatory mechanisms, the financing model, demographic characteristics, the market environment, and technological development determine the conditions under which the clinical, economic, and quality characteristics of dental care are formed. In addition, the external environment influences the way in which the value created is transformed into economic remuneration, by determining the regulatory constraints, the payment mechanisms, and the possibilities for adapting prices to regional and socio-economic characteristics.

In this way, the conceptual framework presents pricing as a process of integration between clinical, economic, quality-related, and social factors, rather than as a mechanical calculation of cost (Figure 2).



Figure 2. Author's conceptual framework for integrated pricing and economic remuneration in outpatient dental care.

Transforming the conceptual framework into a quantitative model

The proposed conceptual framework presents the logical relationships between the factors determining the economic value of dental activities in outpatient care. In order for this framework to be used as a tool for price formation and managerial decision-making, its main components need to be transformed into measurable quantitative indicators. This process constitutes an operationalization of the conceptual framework, whereby abstract concepts are converted into concrete parameters that allow for their quantitative assessment and subsequent mathematical modeling. In this way, the transition from the theoretical concept to a practically applicable pricing model is ensured.

Before presenting the quantitative model, it is necessary to clearly distinguish between the main economic concepts used in the present study. Although often used interchangeably, clinical cost, base value, the value of dental care, and economic remuneration describe different stages of the price-formation process and perform different functions within the conceptual framework.

The clinical cost represents the value of all direct and indirect resources required to provide a specific dental service. It includes the costs of human labor, materials, equipment used, depreciation, overhead costs, and organizational provision. The clinical cost reflects the actual consumption of resources and serves as the economic basis for subsequent modeling.

Based on the determined clinical cost, the base value is formed, which represents the starting quantity in the quantitative model. Unlike the cost, the base value is not merely an accounting indicator but a standardized reference point, to which the individual quantitative components of the model related to professional labor, the quality of care provided, and the characteristics of the external environment are subsequently applied.

The value of dental care is regarded as a broader economic category that reflects the benefit created through the use of available resources. It integrates clinical outcomes, the quality of treatment, patient satisfaction, and the social significance of the service provided. In this sense, value is not a predefined parameter, but the result of the interaction between the clinical, economic, quality-related, and social components of the conceptual framework.

Economic remuneration represents the final financial outcome of the pricing process and determines the amount of payment received by the provider for the dental service rendered. It is formed after integrating the base value with the remaining quantitative components of the model and should reflect not only the resources invested, but also the value created for the patient, the funding institution, and society. Distinguishing between these concepts ensures conceptual consistency between the developed framework and the proposed quantitative model, and allows a clear tracing of the transition from the cost of providing the service to the determination of its economic remuneration.

The transformation process includes four sequential stages: identifying the measurable characteristics of the individual domains, selecting appropriate indicators for their quantitative representation, standardizing the indicators, and integrating them into a unified quantitative model for determining economic remuneration.

This approach corresponds to contemporary methodologies for developing complex models in health economics, in which a conceptual framework is first constructed and subsequently operationalized through a system of measurable indicators subject to empirical validation.

Operationalization of the Components of the Conceptual Framework

The first step in developing the quantitative model is determining how the individual conceptual components can be represented through measurable indicators.

The "Clinical Factors" domain describes the professional resource required to perform the specific dental activity. In the quantitative model, clinical factors are represented through an integral indicator of the professional resource (labor coefficient), which aims to reflect the relative resource intensity of the individual dental activities. In this way, the labor coefficient does not represent an arbitrarily chosen quantity, but an integral indicator of the relative resource intensity of each clinical intervention.

The "Economic Resources" domain is initially assessed quantitatively by determining the clinical cost of the dental activity. After standardizing this cost, the base value is formed, which serves as the starting quantity in the quantitative model and represents the basis on which the remaining corrective components are subsequently applied.

The "Quality of Care" domain is represented through a system of measurable indicators characterizing clinical outcomes. After standardizing these indicators, they can be aggregated into a single quality index, used as a corrective component in the quantitative model. Its content may include indicators of clinical effectiveness, safety, complication rate, the need for repeat interventions, and patient satisfaction. In this way, quality becomes a measurable element that can modify the economic assessment of the dental activity.

The "External Environment" domain is operationalized through regional and systemic corrective components that reflect the specifics of the economic environment, regional differences in costs, regulatory constraints, and the particularities of public financing. In this way, the model accounts for differences in the conditions for providing dental care, without altering its basic conceptual structure. In a future empirical application, this component could be calculated based on official statistical indicators such as regional differences in labor costs, the consumer price index, average wages, or other macroeconomic indicators.

The "Value of Dental Care" domain does not become an independent coefficient, but represents the final result of the interaction between all the other components. In this sense, value is not a pre-set parameter, but an integral characteristic that is formed as a result of the combined influence of the clinical, economic, quality, and regulatory factors.

The operationalization process can be represented as a sequential transition from the conceptual domains to measurable indicators, their standardization, and aggregation into integral indices, which are subsequently included as separate components in the quantitative model. The logic of this transition is presented in Figure 3.

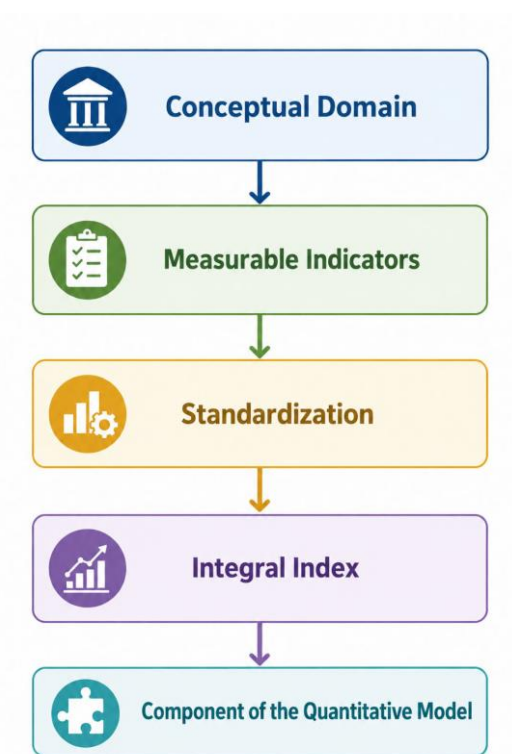


Figure 3. Operationalization of the Conceptual Domains

Figure 3 presents the process of operationalizing the individual conceptual domains. At this stage, each domain defined in the conceptual framework is transformed into a system of measurable indicators, which, after standardization, are combined into an integral index. It is precisely these indices that represent the quantitative reflection of the corresponding conceptual constructs and can be used as separate components in the quantitative model. In this way, methodological traceability is ensured between the theoretical concepts and their quantitative representation.

Unlike Figure 3, which describes how the individual conceptual domains are converted into measurable components, Figure 4 presents the overall process of developing the quantitative model. The process begins with identifying the main conceptual domains that describe the factors influencing the formation of the economic value of dental care. In the next stage, each domain is operationalized through a system of measurable indicators that can be objectively assessed and compared. After their standardization, integral indices are formed, representing the quantitative reflection of the corresponding conceptual components. Only after this process are the individual indices integrated into a single quantitative model, which is subject to empirical validation and subsequent practical application in forming economic remuneration. In this way, a logically justified and methodologically consistent transition is ensured from the theoretical concept to mathematical modeling.

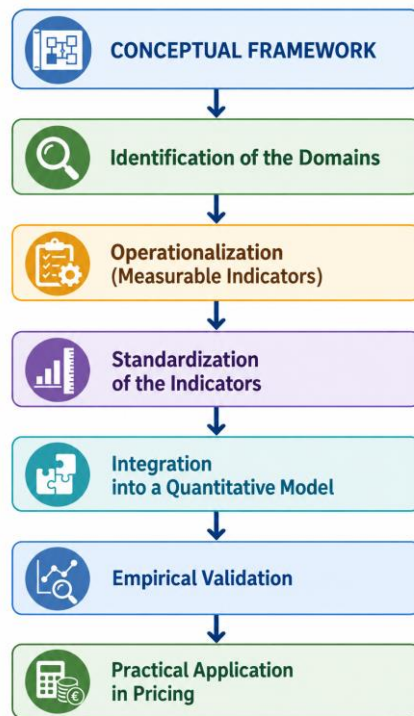


Figure 4. Stages of Developing and Validating the Quantitative Model

The combined use of the two figures ensures full methodological traceability of the proposed approach. While Figure 3 presents the mechanism for operationalizing each individual conceptual domain, Figure 4 illustrates the overall sequence of developing, validating, and implementing the quantitative model. This demonstrates that every mathematical component of the model derives from a previously defined conceptual construct and undergoes a clearly justified process of quantitative representation and subsequent empirical verification.

Structure of the Quantitative Model

After the operationalization of the individual conceptual domains, the structure of the quantitative model for forming the economic remuneration of dental activities can be determined. The quantitative model represents an analytical continuation of the developed conceptual framework, in which the clinical, economic, quality, and systemic factors are represented through measurable and standardized components.

As presented in Figure 3, each conceptual domain undergoes an independent process of operationalization. First, the measurable indicators through which the content of the respective domain can be represented are determined. The indicators are then standardized so that they become comparable regardless of their original units of measurement and ranges. The standardized values can be aggregated into an integral index, which is included as an independent component in the quantitative model.

Figure 4 presents the broader methodological sequence in developing the model. It covers not only the operationalization of the individual domains, but also their integration into a unified quantitative system, the subsequent empirical validation, and

the possible practical application of the model in pricing. In this way, the two figures represent mutually complementary levels of analysis: Figure 3 describes the quantitative transformation of the individual domain, while Figure 4 describes the overall process of developing and implementing the model.

The proposed quantitative model includes four main groups of components:

1. **Base value**, derived from the clinical cost of the dental activity;
2. **Professional resource component**, represented through a labor index or labor coefficient;
3. **Quality component**, formed on the basis of standardized indicators of clinical outcomes, safety, and patient assessment;
4. **Regional and systemic component**, accounting for differences in the external economic, social, and regulatory environment.

The integration of these components allows economic remuneration to be determined not only on the basis of the costs incurred, but also in relation to the relative resource intensity of the activity, the quality achieved, and the conditions under which dental care is provided.

Base Value

The base value represents the starting monetary quantity in the quantitative model. It is formed on the basis of the clinical cost of the respective dental activity, determined by assessing all the direct and indirect resources required for its provision.

Direct costs include materials, medications, consumables, and labor directly invested. Indirect costs cover the depreciation of equipment, maintenance of the material and technical base, administrative servicing, utility expenses, and other organizational costs that cannot be directly attributed to a single specific procedure.

The clinical cost can be represented through the general relationship:

$$CS_i = DC_i + IC_i$$

where:

- CS_i is the clinical cost of dental activity i ;
- DC_i are the direct costs of the activity;
- IC_i are the allocated indirect costs.

After determining the clinical cost, the base value of the activity is formed. Depending on the purpose and the financing model, it may be equal to the cost or may include a normatively defined component for sustainability, investment development, and permissible economic return.

In general terms, the base value can be represented as:

$$BV_i = CS_i \times (1 + M)$$

where:

- BV_i is the base value of activity i ;
- CS_i is the clinical cost;
- M is the permissible component for economic sustainability.

The value of M should not be predetermined arbitrarily. It must be justified through an analysis of actual costs, the regulatory environment, the need for technological renewal, and the sustainability of the dental practice.

Professional Resource Component

The professional resource component aims to account for the differences in resource intensity between the individual dental activities. It does not represent a repeated inclusion of the labor costs already included in the clinical cost, but a relative assessment of the characteristics of the professional activity that cannot be fully represented solely through the duration of the procedure.

These include:

- clinical complexity;
- time required;
- degree of clinical risk;
- required level of professional competence;
- technological intensity;
- the need for additional organization and coordination.

Each of these indicators should be measured through a predefined scale and subsequently standardized. The integral index of the professional resource can be calculated as a weighted sum:

$$LI_i = \sum_{j=1}^n w_j Z_{ij}$$

where:

- LI_i is the labor index for activity i ;
- z_{ij} is the standardized value of indicator j ;
- w_j is the relative weight of the indicator;
- $\sum w_j = 1$.

The relative weights should not be assigned a priori, but should be determined through expert assessment, a Delphi procedure, an analytic hierarchy process, or another multi-criteria assessment approach.

For its inclusion in the model, the labor index can be transformed into a corrective coefficient around a neutral value of 1:

$$LC_i = 1 + \alpha LI_i$$

where α determines the permissible strength of the correction. In this way, an activity with average resource intensity would receive a coefficient close to 1, while activities

with higher or lower resource intensity would receive a corresponding positive or negative correction.

Quality Component

The quality of dental care represents one of the main elements of the conceptual framework, as it determines the degree to which the resources invested are transformed into a real health benefit for the patient. Unlike the clinical cost, which reflects resource consumption, the quality component assesses the outcomes achieved from the service provided.

In the proposed model, quality is not viewed as an independent indicator, but as an integral characteristic formed by aggregating multiple standardized indicators. Depending on data availability and the specifics of the dental practice, the index may include indicators characterizing:

- the clinical effectiveness of the treatment;
- the safety of the interventions performed;
- the frequency of repeat manipulations or complications;
- patient satisfaction;
- compliance with professional standards and clinical guidelines.

After standardizing the individual indicators, they can be integrated into a single quality index:

$$QI_i = \sum_{k=1}^m v_k q_{ik}$$

where:

- QI_i is the integral quality index;
- q_{ik} is the standardized value of indicator k ;
- v_k is the relative weight of the respective indicator;
- $\sum v_k = 1$.

The resulting index can be transformed into a corrective component of the quantitative model:

$$QC_i = 1 + \beta QI_i$$

where β determines the influence of quality on the final economic remuneration.

Determining the values of the individual weights is not the subject of the present study and should be carried out within the framework of a future empirical validation through expert evaluation, multi-criteria methods, or statistical analysis of real clinical data.

Regional and Systemic Component

The formation of economic remuneration is influenced not only by the characteristics of the specific dental activity, but also by the particularities of the environment in which it is provided. Differences in economic conditions, the organization of the health

system, and the regulatory framework can lead to significant differences in the actual costs of performing the same activity.

For this reason, the proposed model includes a regional and systemic component, which has a corrective function. It does not alter the clinical or professional assessment of the activity, but adapts the final economic remuneration to the conditions of the external environment.

In a future practical application, this component could be calculated on the basis of official statistical indicators, such as:

- average wage by region;
- consumer price index;
- regional differences in labor costs;
- demographic characteristics;
- accessibility of dental care;
- particularities of the public financing model.

The regional component can be represented through a corrective coefficient:

$$RC_i = f(R_1, R_2, \dots, R_n)$$

where $R_1, \dots, R_n$ represent standardized macroeconomic and social indicators.

In this way, the model retains its universality, allowing adaptation to different health systems and different financing models.

Integrated Mathematical Structure of the Model

After determining the individual components, they can be integrated into a single mathematical structure for forming economic remuneration. The overall model can be represented through the relationship:

$$ER_i = BV_i \times LC_i \times QC_i \times RC_i$$

where:

- ER_i – economic remuneration for activity i ;
- BV_i – base value;
- LC_i – professional resource component;
- QC_i – quality component;
- RC_i – regional and systemic component.

The developed model has a modular structure. Each component can be developed, updated, or validated independently, without disrupting the overall architecture of the model. This allows for the gradual improvement of the individual elements as new scientific evidence and practical experience accumulate.

It is important to emphasize that the mathematical structure does not represent a final algorithm for determining prices, but a methodological framework that demonstrates

how the individual conceptual domains can be integrated into a single quantitative model.

Conditions for Empirical Validation

The proposed quantitative model represents a conceptual and methodological construct whose practical application presupposes a subsequent empirical verification. Validation aims to assess both the reliability of the individual components and the model's ability to reflect the real characteristics of dental practice. The process of empirical validation should include several successive stages:

1. **Verification of content validity**, through expert evaluation of the included indicators and their correspondence with the conceptual framework.
2. **Verification of construct validity**, through analysis of the interrelationships between the individual components and assessment of the internal consistency of the indices.
3. **Calibration of the relative weights**, by means of multi-criteria methods, the Delphi procedure, the analytic hierarchy process, or statistical models.
4. **External validation**, by applying the model to real data from dental practice and comparing it with the current financing mechanisms.
5. **Sensitivity analysis**, aimed at assessing the influence of the individual components on the final result and the model's stability under changes in the parameters.

Upon successful completion of these stages, the model could be adapted to specific financing conditions while retaining its conceptual structure and capacity for periodic updating. In this way, the proposed approach provides the methodological flexibility needed for use both in scientific research and in the development of pricing and remuneration policies for dental activities.

Empirical Application of the Quantitative Model

The empirical application represents the next stage in the development of the proposed quantitative model and aims to test its applicability using real or pilot data collected from outpatient dental care. While the conceptual framework defines the main domains and the relationships between them, and the quantitative structure presents the way of integrating the individual components, the empirical application allows these theoretical propositions to be tested under the conditions of actual dental practice.

The main purpose of this stage is to establish whether the proposed approach can reliably distinguish individual dental activities according to their cost, professional resource intensity, quality, and conditions of provision. In addition, the empirical application should assess to what extent the resulting economic remuneration is comparable with actually incurred costs, current prices, and the perceived relative complexity of the procedures.

Within the framework of the present study, the empirical application should be regarded as **pilot testing and initial calibration**, rather than as a final 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 under different regional and organizational conditions. This approach is consistent with the sequence already developed in the chapter – from the conceptual framework, through operationalization, to the quantitative model and its practical testing.

Aim and Objectives of the Empirical Application

The main aim of the empirical application is to assess the practical applicability of the proposed quantitative model for determining the economic remuneration of dental activities.

To achieve this aim, the following objectives are set:

1. To select dental activities with different clinical complexity, duration, and resource intensity.
2. To determine the clinical cost of each included activity by assessing direct and indirect costs.
3. To measure the indicators forming the professional resource component.
4. To determine indicators for the quality of the care provided.
5. To include appropriate regional and system indicators.
6. To standardize and aggregate the individual indicators.
7. To calculate the economic remuneration according to the proposed model.
8. To compare the obtained values with current prices, actual costs, and the expert assessments of dental specialists.
9. To perform a sensitivity analysis and an initial assessment of the model's validity.

Design of the Empirical Application

For pilot testing, an **observational, analytical study with a cross-sectional design**, based on data from actual dental practice, may be used. It is appropriate to include a certain number of dental care facilities or individual practices, selected so as to reflect differences in organizational form, locality, regional environment, and the volume of activities performed.

The object of analysis is specific dental activities, and the unit of observation may be:

- an individual procedure performed;
- a standardized clinical case;
- an average value for a given type of activity;
- a combination of a procedure and the patient's clinical profile.

In order to limit excessive heterogeneity, the initial application may cover a limited set of frequently performed procedures representing different levels of complexity. It is

appropriate to include activities from preventive, therapeutic, surgical, and prosthetic dental care.

For example, the pilot set may include:

- preventive examination;
- tooth filling (restoration);
- endodontic treatment;
- extraction of a permanent tooth;
- surgical extraction;
- fabrication of a prosthetic construction.

The selection should make it possible to verify whether the model adequately distinguishes activities with low, medium, and high resource intensity.

Sources and Collection of Data

The empirical application requires the collection of data from several mutually complementary sources.

Data on Clinical Cost

Information on direct and indirect costs may be obtained from:

- the accounting records of dental practices;
- invoices and inventory reports for materials and consumables;
- data on staff remuneration;
- inventory registers and depreciation schedules;
- reports on overhead and administrative expenses;
- time observations of procedure performance.

For each dental activity, the costs of materials, medicines, consumables, direct labor input, equipment use, depreciation, and an allocated share of indirect costs should be assessed.

Data on the Professional Resource

The professional resource component can be measured through:

- duration of the procedure;
- clinical complexity;
- required qualification;
- degree of clinical risk;
- technological intensity;
- need for the involvement of additional staff;
- need for prior preparation and subsequent monitoring.

Some of these indicators can be obtained through direct observation, while others – through structured expert assessment.

Data on Quality

Quality indicators may include:

- achieved clinical outcome;
- presence of early or late complications;
- need for repeat intervention;
- compliance with clinical standards;
- patient satisfaction;
- patient-reported outcomes, where applicable.

The same definitions and follow-up periods should be used for all included practices.

Regional and System Data

The regional and system component may be formed on the basis of official data on:

- average wage;
- labor costs;
- consumer prices;
- density of dental specialists;
- accessibility of dental care;
- population structure;
- socio-economic characteristics of the region;
- conditions and level of public financing.

These indicators should refer to the same period, in order to avoid temporal incomparability.

Determining the Clinical Cost and the Base Value

The clinical cost of each dental activity is calculated as the sum of direct and allocated indirect costs:

$$CS_i = DC_i + IC_i$$

where:

- CS_i is the clinical cost of activity i ;
- DC_i are the direct costs;
- IC_i are the indirect costs allocated to the activity.

Direct costs can be determined through a micro-costing approach, whereby the quantity and unit price of the resources used are established for each procedure. This approach is particularly suitable for dental activities, since the costs of materials, consumables, and time can differ substantially between individual procedures.

Indirect costs should be allocated through a predetermined allocation indicator, for example:

- time of use of the treatment room;
- duration of the procedure;
- number of activities performed;
- area used;
- a combined allocation key.

The choice of allocation base must be justified in advance and applied uniformly across all included practices.

After calculating the clinical cost, the base value is formed. In the pilot application, at least two scenarios can be analyzed:

$$BV_i^{(1)} = CS_i$$

and

$$BV_i^{(2)} = CS_i(1 + M)$$

In the first scenario, the base value is equal to the clinical cost. In the second, a component M, intended to account for economic sustainability and the need for investment recovery, is included. The comparison between the two scenarios makes it possible to assess the influence of this component on the final remuneration.

Calculating the Professional Resource Index

For each dental activity, values are determined according to the previously selected indicators for the professional resource. Because of the different units of measurement, the indicators should be standardized.

A possible approach is min-max standardization:

$$z_{ij} = (x_{ij} - \min(x_j)) / (\max(x_j) - \min(x_j))$$

where:

- x_{ij} is the initial value of indicator j for activity i;
- z_{ij} is the standardized value in the range from 0 to 1.

The integral index of the professional resource is calculated through:

$$LI_i = \sum_{j=1}^n w_j \cdot z_{ij}$$

The relative weights w_j can be determined through:

- an expert panel;
- the Delphi procedure;
- the analytic hierarchy process;
- equal weights, in the initial pilot testing;

- a statistical method, where sufficient observations are available.

The use of equal weights may be admissible only as a baseline pilot scenario, to be subsequently compared with expert- or empirically-determined weights.

The labor index is converted into a corrective component through a predefined function. At a neutral value of 1:

$$LC_i = 1 + \alpha(LI_i - LI_avg)$$

where LI_avg is the reference mean or median value. This form allows activities with average resource intensity to receive a coefficient of around 1, without automatically increasing all activities.

Calculating the Quality Component

Quality indicators should be predetermined according to the type of dental activity analyzed. Not all indicators are equally applicable to all procedures. It is therefore necessary to distinguish between:

- general indicators, applicable to all activities;
- specific indicators, applicable to certain clinical groups.

After standardizing the indicators, the integral quality index is calculated:

$$QI_i = \sum_{k=1}^m v_k \cdot q_{ik}$$

For indicators with an unfavorable direction, such as the frequency of complications or repeat interventions, the values must be reverse-coded, so that a higher standardized score always indicates better quality.

The quality corrective component can be calculated through:

$$QC_i = 1 + \beta(QI_i - QI_ref)$$

where QI_ref is a predetermined reference level of quality.

This form is preferable to an automatic price increase for any positive index, because it allows for:

- remuneration above the base level when quality is above the reference;
- a neutral adjustment when the standard is met;
- a limited negative adjustment for results below the standard.

Minimum and maximum limits of the quality adjustment need to be determined, in order to prevent disproportionate financial effects.

Calculating the Regional and System Component

The regional and system index is formed by standardizing and aggregating selected indicators of the external environment:

$$RSI_r = \sum_{l=1}^p u_l \cdot rr_l$$

where:

- RSI_r is the regional and system index for region r ;
- rr_i is the standardized value of indicator i ;
- u_i is the relative weight of the indicator.

The index can be converted into a corrective coefficient:

$$RC_r = 1 + \gamma(RSI_r - RSI_{ref})$$

The reference value can be the national average, the median value, or the value of a predetermined base region.

When interpreting this component, it is necessary to avoid conflating two different functions:

1. compensation for higher regional costs;
2. incentivizing the provision of services in areas with limited access.

The first function is cost-related, while the second is health-policy-oriented. In practical application, they can be represented through separate sub-components, rather than being merged into a single, non-transparent regional coefficient.

Calculating the Economic Remuneration

Once all components have been determined, the economic remuneration for activity i , provided in region r , can be calculated through:

$$ER_{ir} = BV_i \times LC_i \times QC_i \times RC_r$$

For each included activity, the following should be presented:

- the clinical cost;
- the base value;
- the labor index and coefficient;
- the quality index and coefficient;
- the regional and system index and coefficient;
- the final economic remuneration.

The results can be presented in a summary table:

Dental Activity	Clinical Cost	Base Value	LC	QC	RC	Calculated Remuneration
Activity 1						
Activity 2						
Activity 3						

At this stage, the values must be clearly labeled as **pilot or illustrative**, when they are not calculated from a representative empirical base.

Comparative Analysis

The values obtained through the model should be compared with:

- the current prices under public financing;
- the customary free-market prices;
- the actually established clinical cost;
- the expert-determined fair value;
- the remuneration under alternative scenarios of the model.

The main indicators for comparison can be:

$$D_i = ER_i - P_i$$

and

$$D_i\% = ((ER_i - P_i) / P_i) \times 100$$

where P_i is the current or reference price.

This analysis makes it possible to identify the activities for which there is:

- underfunding relative to resource intensity;
- potential overpricing;
- a mismatch between price and quality;
- regional inequity;
- a need to review the payment mechanisms.

Sensitivity Analysis

The sensitivity analysis aims to establish to what extent the final economic remuneration changes when the main parameters are varied.

Initially, a one-way deterministic analysis can be applied, in which the following are varied in succession:

- the component for economic sustainability M ;
- the parameter α (alpha) for the professional resource;
- the parameter β (beta) for quality;
- the parameter γ (gamma) for the regional adjustment;
- the relative weights of the individual indicators;
- selected unit costs.

It is appropriate for the parameters to be examined within predetermined bounds, for example $\pm 10\%$ or $\pm 20\%$, when reliable confidence intervals are not available.

Where sufficient data are available, a probabilistic sensitivity analysis can be applied by assigning probability distributions to the uncertain parameters and carrying out

Monte Carlo simulations. The results can be presented through the distribution of the possible values of the economic remuneration and confidence intervals.

Assessment of Empirical Validity

The initial validity of the model can be assessed in several directions.

Content validity is assessed through expert opinion on whether the included indicators cover the essential characteristics of dental activities.

Construct validity is examined by checking whether activities expected to have higher complexity and resource intensity actually receive higher values of the corresponding indices.

Criterion validity can be assessed through comparison with an external criterion, for example an expert ranking of the procedures, the actual cost, or an established relative value system.

Convergent validity is examined through analysis of the relationship between the professional resource index and variables such as duration, number of specialists involved, and technological intensity.

Discriminant validity is assessed through the model's ability to distinguish between procedures of different complexity and quality.

The reliability of the integral indices can be assessed through internal consistency, inter-rater agreement, and repeatability of the assessments.

Interpretation of the Results and Limitations

The results of the pilot application should be interpreted as a test of how the model functions, rather than as final proof of the normative adequacy of the resulting prices.

The main limitations may arise from:

- a limited number of included practices;
- a non-representative selection;
- differences in accounting practices;
- incomplete data on indirect costs;
- subjectivity in the assessment of clinical complexity;
- limited traceability of quality outcomes;
- the absence of established dental quality indicators;
- uncertainty in determining the relative weights;
- the risk of double-counting individual resources;
- limited generalizability to the system as a whole.

Particular attention must be paid to avoiding the double-counting of labor. The monetary cost of labor is included in the clinical cost, while the professional component

should reflect the relative complexity, risk, and required competence. These two functions must be clearly distinguished when collecting and analyzing the data.

Summary of the Empirical Application

The empirical application provides the transition from the conceptual and mathematical representation to the practical testing of the proposed model. Through the collection of real data, the standardization of the indicators, the calculation of integral indices, and the comparison with the prices currently in effect, it is possible to assess the model's ability to represent, in a more transparent and economically justified manner, the differences between the individual dental activities.

Pilot testing should be regarded as an iterative process. The discrepancies identified do not necessarily represent a failure of the model, but rather grounds for refining the indicators, the weights, the transformation functions, and the permissible adjustment limits. Only after application to a sufficiently broad and representative empirical base could the model be assessed as a potential tool to support decision-making in pricing and remuneration in outpatient dental care.

6. CONCLUSIONS

1. The analysis of the existing pricing approaches in outpatient dental care shows the need to integrate the clinical, economic, quality, and system factors in forming the economic remuneration.
2. The developed conceptual framework demonstrates that the economic value of dental care is the result of the interaction between the resources used, the professional complexity, the quality of the care provided, and the characteristics of the external environment.
3. The proposed approach allows the conceptual components to be operationalized through measurable indicators and integrated into a single quantitative structure, which ensures transparency and methodological consistency in forming the economic remuneration.
4. The developed methodological construct creates preconditions for future empirical validation and practical application of a pricing model oriented towards value, quality, and the sustainable use of resources in outpatient dental care.

7. CONTRIBUTIONS

Scientific Contributions

1. An original conceptual framework has been developed, through which, for the first time, the clinical, economic, quality, and system factors are integrated into a single methodological basis for forming the economic remuneration in outpatient dental care.
2. An original methodology has been proposed for the operationalization of the conceptual framework by transforming the conceptual domains into measurable indicators, standardized indices, and components of a quantitative model.

3. A conceptual structure of a quantitative model has been developed for determining the economic remuneration, based on the integration of the clinical cost, the professional resource, the quality of the care provided, and the regional and system characteristics.
4. A methodological scheme has been proposed for the empirical application and validation of the quantitative model, which creates a basis for future testing, calibration, and practical use in developing pricing mechanisms in dental care.

Practical and Applied Contributions

1. A methodological basis has been developed for building a transparent and economically justified model for determining the remuneration of dental activities.
2. The proposed model can support the development of future financing and pricing mechanisms by taking into account clinical complexity, the quality of care, and the characteristics of the external environment.
3. The development creates preconditions for the subsequent empirical validation and adaptation of the model to different organizational and financial conditions of outpatient dental care.

LIST OF PUBLICATIONS ON THE TOPIC OF THE DISSERTATION

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2. Popova-Sotirova I., Musurlieva N., Raycheva R., et al. Integrated Model for Effective Pricing and Payment in Outpatient Dental Care: An Empirical Analysis of Patients' and Dentists' Perceptions in Bulgaria. Journal of IMAB. 2025; 31(Suppl.-M):67-69.
3. Musurlieva N., Popova I. A Study of Inequalities in the Provision of Dental Care in Bulgaria. Seventh Scientific Conference with International Participation "Public Health: A Look to the Future", Medical University – Plovdiv, 27–28 September 2024.
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5. Popova I., Musurlieva N. A Survey of Dental Practitioners' Opinion Regarding the Negotiation of Funds with the NHIF. Proceedings of the Scientific Conference "Knowledge, Science, Innovation, Technology", 29 March 2024, Veliko Tarnovo.