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**SYSTEM OF INDICATORS FOR MEASURING AND EVALUATING THE
QUALITY OF HEALTHCARE IN BULGARIA**

ABSTRACT

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The dissertation has a total length of 182 pages and is structured as: an introduction (2 pages), main text in four chapters (119 pages), conclusion (2 pages), list of references (9 pages) and appendices (40 pages). The main text contains 26 tables and 32 figures. 175 titles are cited, 122 in English and 53 in Bulgarian.

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The public defense of the dissertation will take place on2022 at.....h. atat Medical University-Varna at an open meeting of the Scientific Jury.

The defense materials are available at the Doctoral School of the Medical University of Varna and are also available on the university's website.

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I. GENERAL CHARACTERISTICS OF THE DISSERTATION

1.1. Relevance and significance of the problem

The provision of high-quality medical care is one of the most significant problems of modern healthcare systems worldwide. Quality measurement is a critical component in assessing the performance of health-care system in variety countries. Its frequent monitoring is a key factor in the effective management of health systems, because quality measurement improves accountability and transparency¹ and supports important policy decisions regarding their operations².

As an essential feature for the effective functioning of health systems, quality must be managed in a way that ensures the achievement of desired health outcomes for the population. Effective quality management requires the availability of appropriate tools in the form of legal requirements (laws, regulations, medical standards, and good practices) to ensure quality health services for all patients, as well as a nationally validated instrument for assessing and evaluating them to support continuous improvement.

Currently, there is no nationally established practice for systematic measurement, monitoring, and evaluation of the quality of medical care in Bulgaria. The lack of legally regulated means for quality monitoring has a negative impact on the functioning of the healthcare system and, as a result, on the population's health.

The problems of the Bulgarian health system that contribute to or are indicative of an unsatisfactory level of quality are well known: high infant and preventable mortality rates, inequity in the provision of health services, a lack of effective prevention, a limited provision of long-term care, a lack of eHealth development, and a high proportion of informal payments³.

The establishment of a system of indicators for measuring and evaluating the quality of healthcare in Bulgaria will enable its targeted management, provide transparency about the activities of the healthcare system, support the making of adequate health policy decisions to improve its functioning and increase the confidence of stakeholders in the healthcare system.

1.2. Research scope

Quality measurement has long been studied in the scientific literature as a key process for the efficient operation of health systems. Individual countries' and international organizations' existing conceptual frameworks for assessing health system performance have contributed significantly to the establishment of quality as a key characteristic of health system performance.

In terms of research, there are few scientific articles related to the measurement and evaluation of medical care quality in Bulgaria, and there is a general lack of comprehensive

¹ OECD. (2017). *Caring for Quality in Health: Lessons Learnt from 15 Reviews of Health Care Quality*. OECD Reviews of Health Care Quality. OECD Publishing, Paris.

² The Commonwealth Fund (2004). *First Report and Recommendations of The Commonwealth Fund's \international Working Group on Quality Indicators*.

³ Björnberg, A., Phang, A. Y. (2018). *Euro Health Consumer Index 2018 Report*. *Euro Health Consumer Index*

research in this area. Due to the obvious identified need for the development of a particular scientific field, research on the types of approaches and metrics used to measure quality is required. The problem's relevance and importance, as well as the lack of development in Bulgaria, ignited our research interest and prompted to the selection of the dissertation topic.

1.3. Aim, research thesis and tasks / Objective, research thesis, and tasks

The aim of this dissertation is to create a system of criteria and indicators for measuring and evaluating the quality of healthcare in Bulgaria, which will provide in a systematic and appropriate way the information necessary for effective quality management at the national level and at the level of health care facilities and satisfy the information needs of patients, medical professionals, and society as a whole.

The assumptions for this study are as follows:

- The currently available information on health system performance and its outcomes does not allow a comprehensive and in-depth study of health care quality, and this is a major obstacle to its management, the information deficit is due to the lack of adequate regulation of quality and the processes for its measurement and evaluation.

The study design is based on the following research theses:

- There are unmet needs for information about quality among citizens, which leads to a sense of uncertainty among Bulgarian citizens in their choice of a health care facility,

- Medical professionals can have a significant impact on the implementation of quality criteria and indicators, and their attitudes will generally be supportive if their opinions are taken into account.

- A large part of the problems with medical care quality are due to structural and organizational issues in the health system, but the information available on these is insufficient to measure and evaluate quality in order to manage it effectively.

In order to achieve the objective, the following tasks are set:

1. To systematize and summarize the current internationally accepted concepts of quality healthcare as well as the approaches and measures used for its study.

2. To examine the current state of quality healthcare in Bulgaria and the measurement options provided by the existing normative base.

3. To investigate citizens' perceptions of the quality of healthcare in Bulgaria and their information needs in this regard.

4. To investigate the attitudes of medical professionals towards quality measurement and evaluation and their professional assessments of the criteria and indicators to be used in the Bulgaria's quality measurement and evaluation system.

5. To construct a conceptual model for quality measurement and evaluation and to propose specific measures.

1.4. Subject and object of the study

The aim, the main assumptions, research thesis, and defined objectives all imply a multi-component subject and object of the research.

In general, the subject of the dissertation is the Bulgarian health care system, and the object is about the quality of health care and the approaches and tools needed to measure and evaluate it. Citizens and medical professionals are the subjects of sociological research.

1.5. Research approach and research methods

The purpose of a dissertation requires that a construct be adequate to theoretical concepts and international best practices be chosen. In this regard, the general scientific methods of analysis, synthesis, systematization, and summarization of: the scientific literature's understanding of the quality of healthcare, its components, approaches, and tools for measurement and evaluation; the content of current normative documents used to ensure the quality of the healthcare sector in Bulgaria; and the available data published in reports and expert analyses on the state of the healthcare.

The sociological method was used to investigate citizens' and medical professionals' attitudes, perceptions, and information needs regarding quality measurement and evaluation. A graphical method in Excel and statistical analysis for significance (χ^2 -test) were used in data processing. The study was conducted using the specialized statistical software Jamovi Version 2.5.5.

1.6. Materials and methods

Bulgarian and foreign scientific literature sources and reports were used, as well as international and Bulgarian databases and normative documents related to quality of medical care in Bulgaria (laws, regulations, national medical standards, good practice rules, and the National Framework Contract). Two questionnaires were created and used for the study, one for citizens and one for medical professionals.

1.7. Limitations of the study

Only information on measuring the quality of medical care was studied, systematized, and summarized; dental and pharmaceutical care were not considered. The quality of public health activities is only partially addressed insofar as it manifests in some indicators of health system performance and related measures of health facility performance.

The sociological method of using a standardized questionnaire to investigate the perspectives of Bulgarian medical professionals on the criteria and indicators required to measure and evaluate quality does not allow for the comprehensiveness of the possible measures included in the questionnaire.

The two samples of citizens and medical professionals surveyed are not representative of the general population due to the method of conducting the surveys through online questionnaires, the approach to recruiting respondents, and the application of the method of the respondent; there are clusters of respondents by certain attributes such as gender, age,

education, and place of residence for citizens; place of work for medical professionals; and location of the medical institutions.

II. DISSERTATION STRUCTURE AND CONTENTS

2.1. Structure of the dissertation

The dissertation is 182 pages long and includes an introduction, four chapters, a conclusion, a bibliography, and 8 appendices. The primary text comprises 26 tables and 32 figures.

2.2. Contents of the dissertation

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The organization of the study

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III. OUTLINE OF THE THESIS

Chapter 1. Theoretical Foundations of Quality in Health Care and Approaches to/ Its Measurement and Evaluation/ Measuring and Evaluating It

The first chapter analyses and summarizes the theoretical underpinnings of the content and concepts of quality; quality of and in healthcare; and the approaches and tools used to measure and evaluate it. This chapter is divided into three sections, each of which has its own paragraph. Section 1.1 examines and analyzes the basic definitions and concepts of quality in and of healthcare.

Paragraph 1.1.1. discusses different authors' perspectives on the concepts of quality. Although there is no universally acknowledged definition of quality, two of its defining characteristics are generally accepted: quality is an objective attribute of a product, system, or process, and it is related to the satisfaction of certain user needs and criteria.

Producers and consumers have different perceptions of quality, revealing its binary character. Ishikawa defines quality characteristics as 'intrinsic' (consumer aspect) and 'substitute' (professional aspect)⁴, in this context, highlighting the importance of consumer requirements as quality management practice evolves⁵.

In paragraph 1.1.2, the notions of the nature of quality in healthcare are examined, and they are even more diverse than in general quality management theory. The primary reasons for this are the complexity and intricacy in defining the vehicles of quality-healthcare services, as well as the process of delivering medical care or healthcare (including as a process or system) as a whole.

The model, variations, objectives, and structure of a given country's health system, as well as the level at which the relevant actors in the health system are located⁶ (national level, health facility level, patient level, community level, etc.), emerge as significant influences on perceptions of quality.

Although there is no universally accepted definition of quality in healthcare, the Institute of Medicine/IOM in the United States is the most commonly used. The IOM defines quality as "the extent to which health services for individuals and society increase the likelihood of achieving desired health outcomes and are consistent with current professional knowledge⁷, and the Council of Europe adds the requirement to reduce the likelihood of adverse outcomes in addition to increasing the likelihood of achieving desired outcomes⁸. The requirements used to

⁴ Bhise, V. (2013). *Designing Complex Products with Systems Engineering Processes and Techniques*. 1st Edition. CRC Press. Boca Raton.

⁵ Dimova, A. (2004). *Management of quality in hospital*. Varna: Steno.

⁶ Donabedian, A. (1988). Quality assessment and assurance: unity of purpose, diversity of means. *Inquiry*, pp. 173-192.

⁷ Institute of Medicine (1990). *Medicare: A Strategy for Quality Assurance: Volume 1*. Washington (DC), US: National Academies Press

⁸ Council of Europe. (1997). *The development and implementation of quality improvement systems (QIS) in health care*. Recommendation No. R (97) 17 and explanatory memorandum. *Strasbourg: The Council of Europe*.

classify health care as excellent vary, but many of them overlap in interpretation. The United States' Joint Commission on Accreditation of Healthcare Organizations (JCAHO) is the most commonly used categorization in the scientific literature. Accessibility, equity, appropriateness, acceptability, timeliness, effectiveness, efficiency, productivity, and safety are JCAHO quality attributes (quality dimensions) of health care.

The distinction between quality content of and in healthcare is defined in paragraph 1.1.3. The characteristic of quality is determined by the level of stakeholders in the health system as well as the nature of their responsibilities. The main distinction between the two concepts lies in the scope of the object of which the quality characteristics are the carrier. Quality in health care is the broader concept, indicating in general terms the ability of the health care system to achieve its objectives, while quality in health care has a narrower scope, through which differences in patient outcomes achieved in two similar health care settings are defined (Table 1).

Table 1*. Quality assurance functions and a perspective on its definition according to the level of the health system ⁹

Level	Functions	Perspective
National level (health policy)	Defining national priority and aims for quality	The quality of healthcare in a particular country. This is the ability of the health system to provide the desired results for the patients (society)
	Providing the necessary infrastructure to achieve quality, including information technology and equipment	
	Improving the regulatory framework	
	Public communications of data in order to ensure transparency and increase the motivation to improve quality	
	Control- issuing licenses and conducting inspections of healthcare providers	
Health institutions (management system for the organization)	Clinical management(concept/set of techniques for improving the management , accountability and quality assurance of medical care	Quality in healthcare. The quality provided in the specific medical institutions. Study of the reasons for differences between the results for patients in two similar medical institutions
	Creating internal protocols for work and clinical pathways	
	Providing support in making clinical decisions for a patient	
	Implement available safety protocols	
	Creating opportunities for joint training with different institutions	

⁹ Compilation of WHO, OECD, The World Bank. (2018). Delivering quality health services: a global imperative for universal health coverage. Geneva.

Medical specialists	Creating clinical standards and tracking the patient's path	Quality in healthcare. Quality of medical care for the specific patient, quality of the specific health service from the point of view of medical specialists
	Monitoring in compliance with medical standards	
	Conducting a peer review and audit	
	Shared decision –making(between a doctor and a patient) concerning a patient treatment	
Patients and society	Patient , family community involvement (working together to solve various health problems	Quality of and in healthcare Quality of medical care for the specific patient, quality of the specific health service from the point of view of patients and society
	Patient education and “self- management of the disease”	
	Patient participation in the management of the health system	
	Giving feedback from the provided service	

**The tables and figures in the author's abstract are numbered according to their sequence and do not correspond to their numbering in the dissertation.*

The two perspectives on defining quality - of and in healthcare - are inexorably tied; they do not exist independently of one another; the quality of medical care stems from an understanding of the quality of the healthcare process, and vice versa. Defining quality by "increasing the likelihood of achieving desired outcomes" draws attention to certain characteristics of the health care system related to its ability to provide opportunities to receive care that meet the health needs of individuals and society.

Section 1.2 identifies the differences in quality measurement and assessment methods and investigates the different approaches and tools used internationally in assessing the quality of care. **Paragraph 1.2.1** compares the differences between quality measurement and quality assessment and examines the approaches used to assess the quality of health services. Quality measurement and quality assessment are two distinct components of the process of determining the level of quality, and the terms are frequently used interchangeably (in which assessment is implied).

Some authors define quality measurement of health care as "a standard, a benchmark, a reference point by which other things may be assessed"¹⁰, i.e., measurement provides the information by which a subsequent assessment of the state of quality is made.

There are no uniformly accepted approaches and methods by which quality is studied, but they all broadly accept Dr. Avedis Donabedian's concept of three aspects for measuring

¹⁰ National Quality Forum. (2001). The ABC's of Measurement. *Robert Wood Johnson Foundation.*

medical care quality - structure, process, and outcome¹¹. Because of the type of information, they provide, process and outcome emerge as the key guidelines for measuring the quality of health services, according to the various authors' understanding. Structure evaluation is used significantly in the development of health system designs¹¹ and in quality management models based on certification and accreditation¹².

Paragraph 1.2.2 discusses the various types of health care quality measures. The degree of clarity, scope, and object of health service quality measures are classified. Based on their level of accuracy, quality measures are classified as indicators, criteria, and standards. According to their scope, they are categorized into core and composite measures^{13,14}, and, depending on the object of study, into measures of structure, process, intermediate outcome, final outcome, and patient experience¹².

Paragraph 1.2.3 describes the approaches and tools that used to monitor and evaluate the quality of health care on a global basis. In practice, many tools, basically systems of health care quality measurement, are employed in various countries, with some focusing exclusively on outcomes, others on procedures, yet others on patient experience, and still others incorporating all three. Over the last two decades, a rising number of countries and organizations have expressed an interest in one of these methods, specifically Health System Performance Assessment (HSPA). Almost all HSPA conceptual frameworks include quality of care assessment, highlighting its importance and relevance in analyzing health system performance.

The key dimensions and indicators of quality measurement in health system assessment are explored and systematized in Section 1.3. The most commonly used quality dimensions in conceptual frameworks include effectiveness, safety, patient-centeredness, appropriateness, access, and continuity of care. A total of 905 quality indicators were derived through an analysis of conceptual frameworks, with most of them recurrent. Most of the indicators measure outpatient care quality, with a focus on ambulatory care sensitive conditions such as COPD, asthma, diabetes, etc.

Chapter 2. Measuring and evaluating the quality of healthcare in Bulgaria

This chapter systematizes and analyzes the information from the regulatory framework (laws, ordinances, medical standards, and national framework contract) used for quality assurance in the Bulgarian health sector; existing practices for measuring and evaluating the quality of health care in the country; and available data on the level of quality. The regulatory

¹¹ Donabedian, A. (1988). Quality assessment and assurance: unity of purpose, diversity of means. *Inquiry*, pp. 173-192.

¹² Morris, C. and Bailey, K. (2014). Measuring Health Care Quality: An Overview of Quality Measures'. *Health System Improvement*, pp. 1–16. doi: 10.1157/13102270.

¹³ Blumenthal, D., Malphrus, E., McGinnis, JM. (Eds). (2015). Committee on Core Metrics for Better Health at Lower Cost, Institute of Medicine. *Vital Signs: Core Metrics for Health and Health Care Progress. Washington (DC): National Academies Press (US); PMID: 26378329.*

¹⁴ Landrum, M. B., Nguyen C., O'Rourke, E., Jung M., Amin T., Chernew M. (2019) *Measurement Systems : A Framework for Next Generation Measurement of Quality in Healthcare.*

framework's information is systematized, summarized, and assessed using the following criteria:

- the existence of a definition of quality as a starting point for defining its requirements and possibly more specific measures,
- included quality measurement objects according to the Donabedian concept of structure, process, and outcome quality,
- included quality dimensions as described in paragraph 1.3.1. and specific criteria for each of them,
- the existence of measurable quality indicators and any target values set for these indicators in relation to the evaluation.

The chapter is divided into 3 sections, the first of which has three paragraphs.

Section 2.1 examines the following health-care laws - Health Act, Health Care Establishment Act, Health Insurance Act, Act on the Professional Organizations of Physicians and Dentists, Act on Blood, Blood Donation and Blood Transfusion; Act on Transplantation of Organs, Tissues and Cells, Act on the Professional Organizations of Nurses, Midwives and Associated Medical Specialists, Dental Technicians and Assistant Pharmacists.

None of these laws provides a general definition of quality that sets the guidelines for the requirements for the health system, organizations or activities regulated by them. The main laws – the Health Act, Health Insurance Act, and Health Care Establishment Act - concern mainly the structure and process of health care delivery, as well as the dimensions of quality of health care accessibility, equity, and, to a lesser degree, responsiveness of the health care system (in terms of respect for patients' rights and awareness) and appropriateness (in relation to compliance with methods and techniques established by medical science and practice, medical standards, and rules of good medical practice). However, laws do not exist for all quality dimensions, or they cover only a subset of the dimension's content.

The basic laws, according to the research, do not provide a sufficiently solid and comprehensive framework for establishing all of the needed requirements for quality in healthcare and ensuring their practical implementation.

The ordinances based on these laws provide requirements and criteria primarily for the process of medical care, but also for the outcome and, to a lesser extent, for its structure. The quality dimensions to which the requirements apply are primarily effectiveness, appropriateness and timeliness.

Paragraph 2.1.2 analyzes the information from 14 national medical standards. National medical standards are extremely heterogeneous in terms of their structure and content, understandings of quality, and approaches to its assurance and measurement. For the first time, the Health Care Establishment Act of 2019 contained a demand on the structure of medical standards, requiring the inclusion of quality criteria in medical standards. The analyzed medical standards contain detailed measures of structure of medical care. Process, and outcome

measures are also present (separately or jointly), but they are not as comprehensive as the structure requirements. The criteria and indicators for quality of care are not separated into an independent component of the majority of standards, but are found in different sections of the standard. The good medical practice rules include requirements for process quality criteria focusing mainly on one of the dimensions of quality –patient-centeredness; appropriateness and safety are also covered to some extent. They formulate general criteria on how to communicate with the patient and his/her relatives; how to provide information; how to respect the patient's rights; and how to discuss treatment options (patient-centeredness). Appropriateness and safety are the other common dimensions of quality. Good medical practice rules, like national medical standards, are characterized by a great heterogeneity in terms of their structure and content.

The most explicitly specified and measurable criteria and indicators for the quality of medical care are included in the National Framework Contract 2020–2022 (NFC), as discussed in **paragraph 2.1.3** of the legislative framework. In the NQF, quality is understood in its narrow sense - as 'quality of medical care' (rather than 'quality of healthcare'). In NFQ, explicit criteria and indicators are defined to measure the process and outcome of primary care, and the target values set for the indicators allow for evaluation (in addition to measurement). The primary care process is measured by criteria of accessibility, timeliness, and minimum duration of examinations (most likely in relation to effectiveness as a dimension of quality). Clinical criteria are mostly used to measure patients' health status. The NQF 2020-2022 includes quality measures related to primary care. For monitoring and analyzing the quality of hospital treatment, the quality and accessibility criteria included in recognized medical standards are used.

Section 2.2 discusses Bulgaria's current and previous quality assessment and evaluation practices. Accreditation was the first approach adopted in 2000, and it underwent various changes in terms of evaluation criteria over the years until being phased out in 2019.

In 2015, the Ministry of Health prepared two ordinances on the measurement and evaluation of medical care quality - one on the study of patient satisfaction with medical care purchased by the National Health Insurance Fund (NHIF), which was promulgated in the State Gazette but was cancelled by the Supreme Administrative Court in 2017, and another on a National Medical Standard titled "Health System Indicators," which is still a draft. There are currently no nationally established methods or acceptable instruments for assessing and evaluating healthcare quality.

Due to the elimination of accreditation, a reform was made to the Health Care Act that allows health care institutions to freely construct and engage in self-assessment and quality rating systems through contact with one another and with professional and patient organizations. The individuals who set up these systems define the criteria for participation and the process of evaluation. There are several rankings in Bulgaria that identify the quality of care delivered by individual physicians and healthcare facilities, and these rankings are managed by a variety of organizations and institutions. Because of their volunteer character and the lack of comprehensiveness and systematicity of the assessments, these rankings are more for the

prestige of healthcare facilities and individual medical experts than for improving healthcare quality.

Section 2.3 analyzes publicly available data on healthcare quality in Bulgaria, derived from reports and electronic databases of national and international organizations. The information is organized in accordance with the quality dimensions indicated in paragraph 1.1.3. During the research, two major issues surfaced that hindered a comprehensive and in-depth study of the quality of healthcare- the scarcity of available information and, in some cases, doubts about its accuracy. Based on the research, inadequate levels of health care quality have been discovered, as have data needs across all dimensions of quality.

Chapter 3. Citizens' and medical professionals' attitudes and information needs regarding quality and its measurement

This chapter presents the results of the two surveys that examined citizens' and medical professionals' attitudes and perceptions of quality and their information needs.

Section 3.1. presents the results of the citizens' survey, beginning with a description of the organization of the survey and the instrument used. The citizen survey was conducted in November 2021 in an online format through the *survs.com* platform, using the respondent method, via a standardized online interview. Two approaches were used to recruit respondents: (1) an invitation to participate in the survey and a link to the survey were sent to a wide range of potential respondents from across the country via social networks and (2) a targeted invitation to participate was sent to social network groups of people with specific needs (patients with chronic diseases: oncological, gastroenterological, endocrinological and rheumatological; people with disabilities; parents of children up to 18 years of age with special needs).

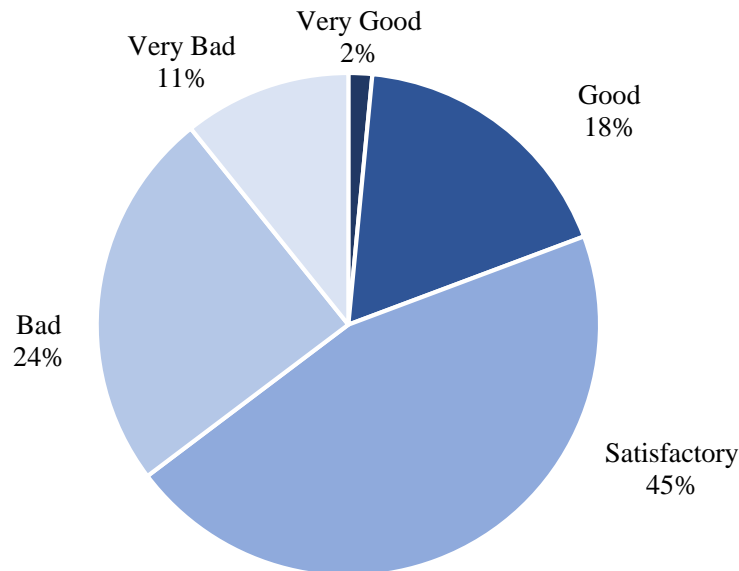
The questionnaire was developed based on the scientific literature on the components of health care quality and information needs in relation to the aim and objectives of the dissertation. The questionnaire contains 15 questions, 13 of which are of the "closed" type and two of the "open" type, which are used to explore citizens' assessment of the quality of healthcare in Bulgaria, measures of consumer quality, public attitudes towards the measurement of healthcare quality in the country and questions providing information on the demographic characteristics of the respondents.

The electronic questionnaire form is designed so that respondents can review all questions before they begin completing, ensuring an informed and reasoned decision to participate in the survey. According to the *survs.com* platform, 2,371 citizens visited and viewed the survey, of which 1,117 completed it in full; an analysis of data from 1,114 surveys was conducted. The results were tested for statistical significance (χ^2 -test), using specialized statistical software Jamovi Version 2.5.5.

The majority of respondents were in the 35-44 (30%) and 45-54 (27%) age groups and had a university degree (66%). Just over 56% of respondents live in a regional city, 23% live in Sofia, 16.2% live in a small town, and 4.7% live in a village. The targeted mailing of the survey to certain groups largely determined the health profile of respondents. The majority had

good experiences with the health care system, such as patients with one or more chronic diseases (59%), parents of children under 18 (36.4%), people whose family members frequently needed medical care (21.7%), and people with disabilities (11.8%). As expected, citizens' assessment of the quality of healthcare in Bulgaria is generally low. Only 20% of respondents rated it as good or very good, and the largest proportion (45%) rated it as fair (Figure 1; $\chi^2=1295$, $p<.001$).

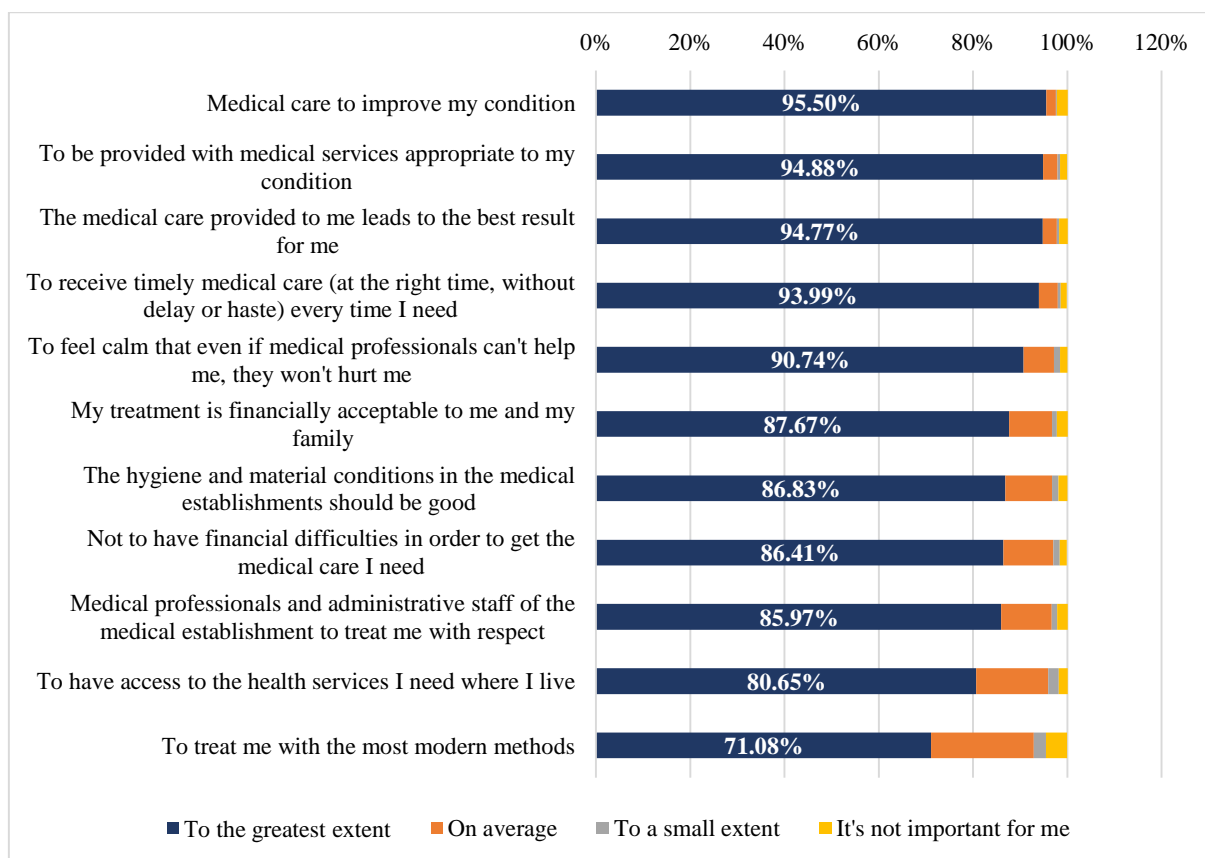
Figure 1. A summary of the healthcare quality assessment



An overwhelming percentage of respondents (66.3%) considered that the quality of treatment in Bulgaria is generally lower than in most European countries. Respondents' assessments of the quality of healthcare are based on their personal experience as patients (88.3%), as well as the experience of their relatives, friends and family (61.7%).

Citizens' understanding of the quality of healthcare is important for its measurement and evaluation. In the ranking of the components of consumer quality, those related to efficiency, appropriateness and timeliness come to the fore and mainly take into account the outcome of the medical care provided. For the largest proportion of respondents (94-96%; the top four requirements in Figure 2), high quality medical care leads to improved patient outcomes, or at least the best patient outcomes, based on the timely provision of medical services that are appropriate for the patient's condition.

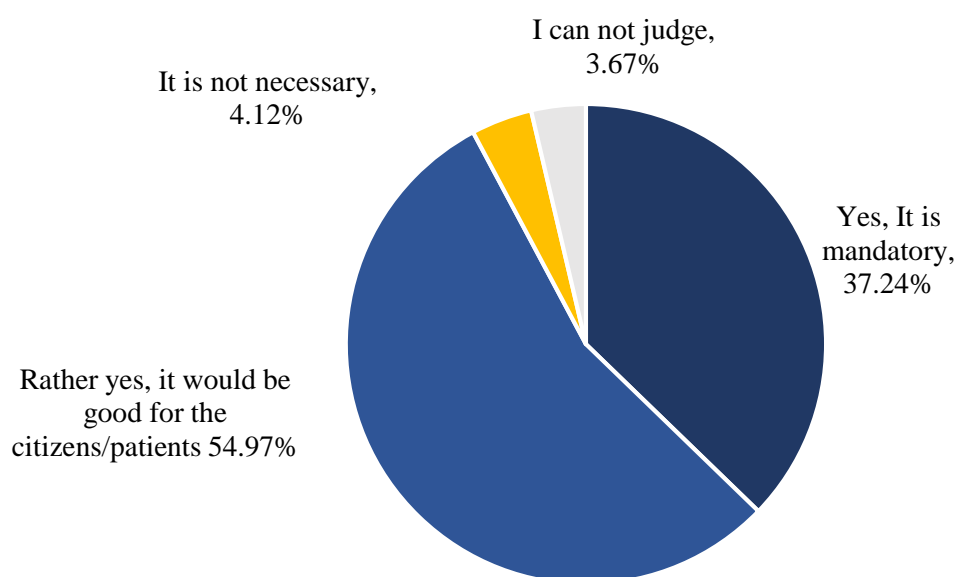
Figure 2. Citizens' perceptions of high-quality medical services: the significance of quality characteristics (components of consumer quality)



According to the majority of the respondents, a national system for measuring the quality of healthcare in Bulgaria must provide information on the safety of medical care (81.9%), the applied modern methods and means for diagnosis and treatment (80.6%), the results of the treatment of patients in medical institutions (71.6%), the facilities available to medical institutions in terms of equipment and equipment (67.5%), violations and sanctions imposed on medical institutions (60.9%) and the financial resources allocated for healthcare (55.8%). In order to choose a specific medical facility for which patients have an expectation of quality medical care, citizens clearly need - again in the first place - information on whether safety is guaranteed for patients (70.3%). Public perceptions towards a particular doctor/medical professional (expressed generally through the satisfaction of his/her patients) and the equipment available at the facility are next in importance with nearly 63% of respondents stating categorically that information on these two indicators is important to them.

An overwhelming proportion of citizens share a positive attitude towards the measurement of the quality of healthcare facilities (Figure 3). A majority (55 %) think that these rankings should be created by patient organizations, demonstrating the significance of consumer assessment of quality but also indicating a lack of trust in institutions and professional organizations in the healthcare system.

Figure 3. Ranking of medical establishments in Bulgaria



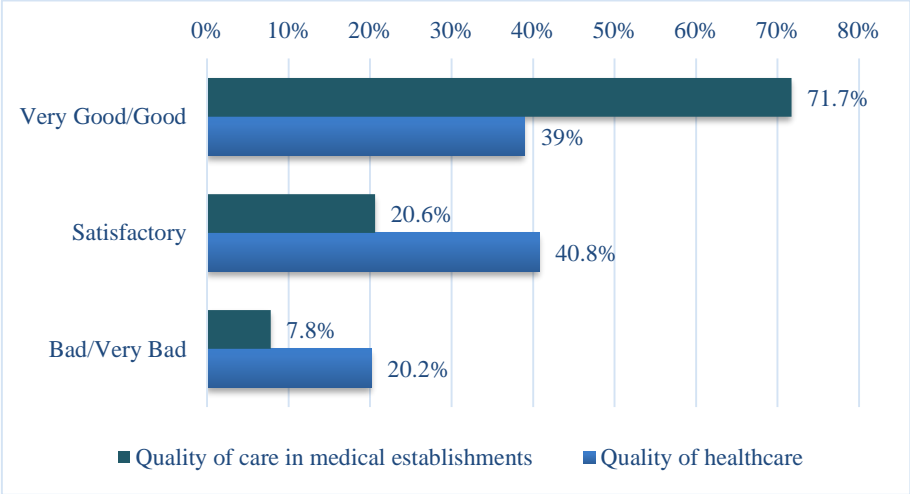
Section 3.2 presents the results of the survey of medical professionals. The survey of medical professionals was conducted in November 2021 in an online format by a polling agency. In addition, an invitation to participate in it was sent by e-mail by the PhD student and his supervisor to the Bulgarian Association of Health Care Professionals (BAPCHP), the Bulgarian Medical Association (BMA), the National Association of General Practitioners in Bulgaria (NAGPB), directors and managers of hospitals and to medical professionals with a Master's degree in Health Management from the Medical University - Varna. The study involved 282 medical professionals

The questionnaire contains 19 questions - 16 of the "closed" type and 3 with the possibility of free response, which are used to investigate the assessment of medical professionals on the quality of healthcare, the measures to be used in the system for measuring and evaluating the quality of the healthcare system, the attitudes of those working in healthcare towards the measurement and evaluation of quality and questions related to the professional profile of respondents.

Representatives of all major groups of health care professionals participated in the survey - doctors (35%, of whom 79% have a specialty), health care professionals - nurses and midwives (30%), laboratory technicians and rehabilitation specialists (26%). Approximately half of the medical specialists have a long professional experience of more than 20 years in the field of health care (46.5%), followed by specialists with experience of up to 5 years (18.1%) and between 11-20 years (16.7%). A dominant proportion of professionals' work in a regional city (78.4%), mainly in multi-specialty active treatment hospitals (31.9%) and medical and diagnostic consultative centers (19.9%) and predominantly in public health facilities (64.9%). The study covered a limited number of respondents working in medical facilities in a small town (8.5%) and a village (0.7%).

Medical professionals placed a higher value on the quality of the health facilities in which they worked than on the quality of health care in general (Figure 4). Over 70% of respondents rated the quality in their own health care facility as very good or good, while only 39% rated the quality of health care in Bulgaria the same, and over 40% rated it as fair.

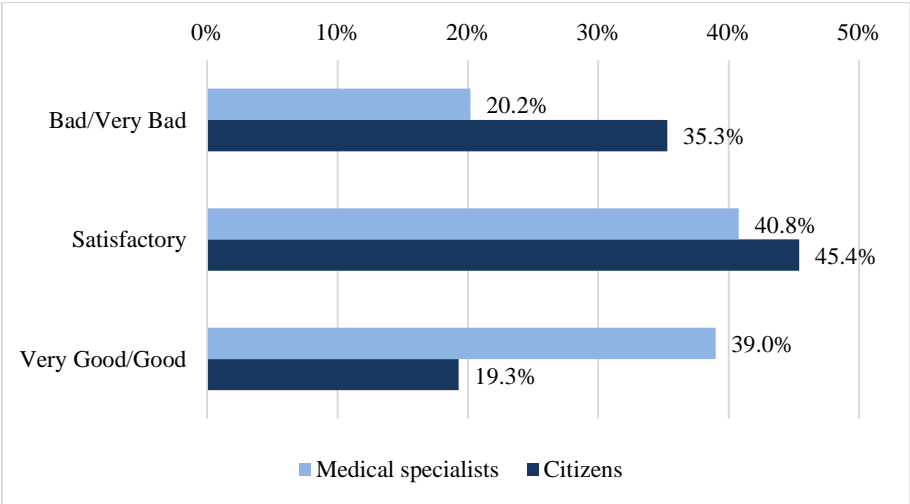
Figure 4. Medical professionals' summary assessment of the quality of healthcare and the quality of care in medical establishments where they work.



According to the specialists, insufficient medical staff (70.6%) and insufficient healthcare funding (60.6%) are the leading problems making it difficult to guarantee quality for every patient. None of the medical professionals who participated in the survey indicated that there is no problem with ensuring quality for every patient in Bulgaria.

Medical professionals' assessments of healthcare quality differ from those of citizens. Citizens are significantly more critical. The largest percentage of both citizens and professionals give a satisfactory rating to the quality of healthcare, but the second largest proportion among patients is those giving a bad and very bad rating, in contrast to medical professionals, where there are more of those who rate the quality as very good and good (Figure 5). This shows once again the differences in perceptions of patients and professionals towards quality in healthcare.

Figure 5. Citizens' and medical professionals' assessments of healthcare quality in Bulgaria



Despite these discrepancies, medical professionals are relatively well aware of citizens' negative attitudes towards quality and even assume lower scores than citizens actually give. The largest proportion of medical professionals (47.1%) believe that citizens would give quality a bad or very bad rating, while the largest proportion of citizens (45.4%) actually rate it as satisfactory.

The quality measures that medical professionals believe should be included in a national measurement and evaluation system are explored through two questions (№8 and №9 in the survey), in which respondents rate in order of importance on a four-point scale from "extremely important" to "not important at all" the quality dimensions (question №8) and the indicators on each of the dimensions that it is "required", "desirable" or "not required" to report (question №9). Table 2 shows the percentage distribution of responses and the average score for their importance. The average scores are calculated as the sum of the products of the number of respondents indicating the respective score and the importance factor (for question № 8: 4 for 'extremely important', 3 for 'rather important', 2 for 'rather not important' and 1 for 'not important at all', 0 for 'cannot judge'; for question 9: 2 for 'must', 1 for 'desirable' and 0 for 'not necessary' divided by the total number of respondents. The use of mean scores allows for easier interpretation of the results. With the coefficients set in this way, the maximum score that a quality dimension can receive is 4, and for indicators it is 2.

All of our proposed quality dimensions were rated as "extremely important" for the purposes of measuring and evaluating the quality of healthcare at the national level in Bulgaria by the majority of medical professionals (Table 2). However, certain dimensions stand out as more significant. First of all, medical professionals consider it extremely important to measure their professional satisfaction (82.6%, an average grade 3.8) and the effectiveness of medical care (81.6%, an average grade 3.8). Although the satisfaction of medical professionals is not defined as an dimension of quality in the scientific literature, it was included in the questionnaire due to our assumptions, which are justified by the results obtained, that for the evaluation of the quality of healthcare in Bulgaria in particular, the level of satisfaction of medical staff will be an important indicator.

The elements of quality with lower average scores in the ranking of medical professionals are largely connected to systemic difficulties of the health system: continuity, accessibility, efficiency, and equity. This category also includes patient satisfaction as an intrinsic indication of quality evaluation.

Table 2. Significance of quality dimensions for the purpose of its measurement and evaluation at national level

Dimensions of Quality	Indicated the corresponding answer %				An average grade	
	Extremely important	It is rather important	Rather not important	Not important at all	I can't judge	
<i>Satisfaction of medical specialists</i>	82.6	14.5	1.4	1.1	0.4	3.8
<i>Effectiveness: the medical services are provided in order to</i>	81.6	17.0	0.7	0.0	0.7	3.8

achieve the best outcomes for patients.						
Appropriateness: the medical services are provided precisely the appropriate ones (according to the needs and scientific evidence)	79.1	19.1	0.4	0.0	1.4	3.7
Timeliness: the medical services are provided at the right time (no later, no earlier).	76.6	19.1	2.1	0.4	1.8	3.7
Safety: the medical services are provided in the absence of risk of harm to the patient as a result of medical care.	75.9	19.5	2.1	0.4	2.1	3.7
Continuity of care: monitoring the "patient's path" at all levels in the health system and the integration of healthy services.	69.9	25.5	3.2	0.4	1.1	3.6
Accessibility: availability of opportunities for the provision of health services (geographical, price)	68.8	28.4	1.1	0.0	1.8	3.6
Efficiency: medical services lead to the desired health outcomes with minimal labor costs, material and financial resources (without unnecessary costs and efforts).	68.1	26.2	3.5	0.4	1.8	3.6
Patient satisfaction	67.0	24.1	6.0	1.8	1.1	3.5
Equity: medical services are provided on an equitable basis to all solely according to health needs (regardless of patients' socioeconomic characteristics)	66.3	24.1	4.6	1.4	3.5	3.5

The indicators proposed in the questionnaire (question №9) are divided into three groups – effectiveness and safety; accessibility, efficiency and timeliness; appropriateness and continuity of care. The grouping was done for ease in completing the questionnaire, for greater objectivity in assessing individual indicators, and because individual indicators can be attributed to (used in the context of) different quality dimensions. The indicators for early diagnosis of cancer, preventable mortality, infant mortality and survival cancer rate- from the group of indicators for effectiveness, and the availability of medical specialists by type - from the group of indicators for accessibility stand out as mandatory for inclusion in the system of indicators for measuring and evaluating the quality of healthcare in Bulgaria with average scores of 1.9 and 1.8. At the bottom of the rankings remain most of the proposed indicators for appropriateness and safety, despite the fact that both quality dimensions are leading in importance for quality measurement and evaluation over accessibility and efficiency.

A large majority (over 80%) of medical professionals reported the need for healthcare quality to be measured periodically and systematically, both at the national and facility level, in a way that allows for traceability and comparability of results. According to the overwhelming share of medical professionals (51.4%), the final assessment of the quality of medical activity in a specific medical facility should be based on the comparison of the achieved results (indicator values) with a set of predefined values - indicators for the same medical facility for the past period of time, indicators for other medical facilities of the same type, so that comparison between them and with target values is possible. About ¼ of medical

professionals consider that a final score obtained on the basis of a comparison between the results achieved and the targets set is sufficient.

In section 3.3. the main findings of the two sociological surveys are presented, systematized in three groups:

Assessment of health care quality:

- Both citizens' and medical professionals' assessment of the quality of healthcare in Bulgaria is unsatisfactory, although medical professionals generally rate is higher. Medical professionals rate the quality of the medical institutions where they work higher than the quality of healthcare in general.
- According to both respondent groups, the health care system is currently unable to guarantee quality medical care to all patients, which according to the professionals is mainly due to two problems - the provision of human and financial resources of the system.

Quality dimensions:

- All of the proposed dimensions of healthcare quality were rated by both study groups as important for the purposes of measuring and evaluating healthcare quality.
- There are some differences between citizens and professionals regarding their perceptions of health care quality, which are evident when ranking items for the national quality survey:
 - for citizens, safety and appropriateness (in relation to the modern diagnostic and treatment methods used) are top priorities;
 - medical professionals identify professional satisfaction and efficiency as leading for measuring and evaluating quality.
- Medical professionals ranked the indicators related to efficacy (early diagnosis of cancer, mortality preventable with good prevention and treatment, infant mortality and cancer survival) and accessibility (availability of medical professionals) as the most important (with the highest average score) for the purposes of the measurement and evaluation system.
- In order to be able to trust a particular health facility, citizens need information on the level of safety, patient satisfaction with a particular health professional and the availability of medical equipment.

Attitudes towards quality measurement:

- There is a high information need and a positive attitude towards quality measurement among citizens and health professionals, both at national and facility level.
- Professionals believe that quality in health care should be measured periodically and systematically in a way that allows for traceability and comparability of results.

- Citizens state that the rankings of medical institutions should be made by patient organizations, which is a sign of the lack of trust in institutions and professional organizations.

Chapter 4. Healthcare Quality Measurement and Evaluation System

Chapter 4 presents a conceptual model of the system of indicators for measuring and evaluating the quality of healthcare in Bulgaria. The indicators are systematized by dimensions and quality criteria and proposes an approach for the implementation of the system. The aim of the system of indicators for measuring and evaluating the quality of healthcare in Bulgaria is stated in **section 4.1**. The quality system's goal is to provide opportunities for effective management, such as assisting health policymakers in making rational health policy decisions for the development of the healthcare system and evaluating healthcare policies; healthcare facilities and professionals in selecting quality purposes and effective management of healthcare facilities; citizens in making informed choices of healthcare establishments; and consumer pressure. **Section 4.2** describes the system's components, which include the dimensions of quality grouped in a conceptual model, as well as the criteria and indicators for measuring and evaluating quality in Bulgaria.

The conceptual model containing the key dimensions of healthcare quality with a focus on ensuring the quality of care for each patient (an issue that appears to be key in relation to quality management in Bulgaria) as a prerequisite for improving health outcomes for society is presented in **paragraph 4.2.1**. Depending on the etymology of the current issues and the levels at which their solution (or specific outcome) should be sought - health system, health facility, patients, and professionals - the dimensions of quality are referred to structure, process, or outcome.

Paragraph 4.2.3 presents the system of indicators for measuring and evaluating the quality of healthcare in Bulgaria. The indicators (89 counts) are grouped by quality dimensions and the criteria used to evaluate them.

The effectiveness indicators (Table 3) are distributed according to the effectiveness criteria of preventive and prophylactic activities (processes) and of treatment, including diagnostics. Safety is measured by the criteria of occurrence of adverse events/medical errors, conditions associated with safety problems, the presence of a system for recording incidents/errors as a prerequisite for ensuring safety and the attitudes of patients and medical professionals (Table 4). Appropriateness is measured by criteria that indicate rather lack of adequate care - overuse/unnecessary use of medical care and medicines and necessary but not provided health services (Table 5). The main criterion for measuring timeliness is waiting time to receive needed medical care (Table 6), and for accessibility, barriers to access, mostly geographic and financial (Table 7). Considering the leading problems in the organization of medical care delivery, the criteria of patient care organization and the use/availability of information technology enabling connectivity between medical facilities were chosen to measure continuity of care (Table 8).

The indicators marked with * are specific to the Bulgarian health system, i.e. they are not found in the frameworks for assessing the functioning of health systems of individual

countries and organizations or are not frequently found, but, in our opinion, are important for the Bulgarian context.

Table 3. Indicators on effectiveness of care

Indicators
<i>Effectiveness of prevention and prophylaxis</i>
Preventable mortality
Suicide rate
Prenatal mortality
Proportion of breast cancer cases (cancers in general) diagnosed in stages 1 and 2
Cancer screening rates (breast, cervical, rectum)
Hospital admission rates due the complications of diabetes/asthma/COPD
Vaccinations coverage of population (recommended and required vaccines)
Rate/Incidence of vaccine-preventable diseases
Early detection/diagnosis of cancer diseases
Infant mortality
<i>Effectiveness of treatment</i>
Treatable mortality
Lethality (by diagnosis)*
30 day mortality following heart attack/stroke
Mortality of lung cancer (within 1 year of diagnosis)
Deaths per 1000 hospital admissions patients with pneumonia
Prenatal mortality
Neonatal mortality
Rate of diabetic patients with complications
Breast cancer 5-year relative survival rate
Cervical cancer 5-year relative survival rate
Colorectal cancer 5-year relative survival rate
Kidney/Liver transplant 5-year observed survival rate
Coincidences of diagnoses (basic-operative; admission - pathomorphological)

Note: * specific for Bulgaria

Table 4. Indicators on safety of care

Indicators
<i>Adverse events/ medical errors</i>
Incidence rate of nosocomial infections
Incidence rate of postoperative sepsis
Central venous catheter-related blood stream infection rate
Incidence rate of blood transfusions with adverse effects
Incidence rate of post-operative pulmonary embolism or deep vein thrombosis, after hip or knee replacement
Medication error rates

Rate of obstetric trauma after vaginal delivery
Incidence rate of foreign body after surgery
Number of patient complaints to healthcare safety inspections and lawsuits*
Conclusions from safety inspections and convictions *
Mortality rate after surgical procedures (by type)
<i>Conditions associated with safety issues</i>
Mortality rate after hip replacement surgery
Maternal mortality (associated with pregnancy, childbirth and the puerperium)
Incidence rate of deep vein thrombosis (after hip or joint replacement)
Incidence rate of postoperative haemorrhage or haematoma
Unplanned hospital readmission rates - appendectomy, cataract surgery, hip replacement, hysterectomy, knee replacement, prostatectomy, tonsillectomy and adenoidectomy
Hospital readmission rates due to surgical site infection
<i>Others</i>
Medical error registration (yes/no at national level; availability of regulations or guidelines at national level; percentage of medical establishments with medical failure system)*
Proportion of medical professionals who are concerned about making a mistake*
Proportion of people/patients who are more likely to be harmed during medical care. *

Note: * specific for Bulgaria

Table 5. Indicators on appropriateness of care

Indicators
<i>Overuse/unnecessary use (-) of medical care</i>
Caesarean sections per 1000 live births
Medical imaging per 100000 population
<i>Medication use</i>
Antibiotic use in children and adolescents - rate of children and adolescents (0-19) with prescribed antibiotics
Use of antibiotics (total DDD/1000 pop/day)
Polymedication among the elderly (% pop aged 65+) consuming 5 or more different drugs within last 24 hours
<i>Indicators for necessary but unprovided medical services (-)</i>
Proportion of stillbirths and premature births among unobserved pregnant women*
Proportion of monitored pregnancies *
Proportion of pregnant women referred for specialist due to symptoms of a health problem*
<i>Common appropriateness indicators</i>
Hospitalization rate of full-term newborn in neonatology.

Ambulatory care-sensitive hospitalization rates (asthma, diabetes, hypertension, COPD, heart failure, angina pectoris)

Note: * specific for Bulgaria

Table 6. Indicators on timeliness of care

Indicators
Waiting times for medical care by type (emergency, examination, laboratory/medical imaging examination, hospitalization)
Proportion of patients with difficulty accessing emergency care at night and on weekends
Average time to make an emergency call (from the emergency call center) in minutes
Waiting times for emergency department care (in minutes)/availability of triage-waiting time according to category
Average waiting time for GP examination in days/proportion of patients with the possibility of GP examination during the day if necessary
Average time to wait for an examination by a specialist (days)
Waiting time for hip fracture surgery
Waiting time for receiving oncosurgery/drug therapy/chemotherapy/radiation therapy (days from appointment to start)
Waiting time for computed tomography
Waiting time for physiotherapy in hospital/outpatient care
Waiting time for palliative care *
Waiting time for psychiatric treatment in hospital*

Note: * specific for Bulgaria

Table 7. Indicators on accessibility of care

Indicators
<i>Access barriers</i>
Medical specialists (by type)
Provision of medical and health facilities (by type)
Health insurance coverage of the population (population covered)
Proportion of people with unmet health-care needs due to financial constraints
Proportion of people with unmet health care needs because of distance
Health expenditure by function (outpatient care, hospital care, pharmaceuticals)
Health expenditure (public/private)
Proportion of uninsured people passed through the emergency departments*

Note: * specific for Bulgaria

Table 8. Indicators on continuity of care

Indicators (selected)
<i>Patient care organization</i>
GP encounter within the week after hospital discharge (% patients)
Proportion of patients with secondary examinations up to 30 days after hospital discharge (one, two) *
Proportion of patients with myocardial infarction/stroke referred for outpatient rehabilitation*
<i>eHealth</i>
Coverage of electronic medical record
Availability of electronic health documents allows connectivity between medical institutions.

Note: * specific for Bulgaria

Table 9. Indicators on satisfaction of care

Indicators (selected)
<i>Patients' satisfaction</i>
Proportion of citizens satisfied with the quality of healthcare *
Proportion of patients whose information needs have been met*
Proportion of patients who have faith in the health-care system and medical professionals*
<i>Medical professionals' satisfaction</i>
Proportion of medical professionals satisfied with the quality of healthcare *

Note: * specific for Bulgaria

The suggested criteria and indicators system for measuring and evaluating healthcare quality in Bulgaria does not pretend to be complete. It focuses on the most pressing current quality issues in order to develop suitable evidence-based strategies to solve them. The quantity and kind of indicators can be adjusted and increased over time based on population health outcomes and management needs.

Section 4.3 proposes an approach through which a system of indicators for measuring and evaluating health care quality in Bulgaria can be effectively implemented, in a sequence of four steps:

1. Making a health policy decision to introduce a quality measurement and evaluation system and engaging stakeholders. The introduction of a quality measurement and evaluation system for health care in Bulgaria requires, first of all, a health policy decision by the Ministry of Health for its establishment, which should be supported by stakeholders. Previous experience with the implementation of quality assessment rules (the health indicators regulations and the patient satisfaction survey, section 2.2) reveals that if there is no support in principle from stakeholders as soon as the health policy choice is taken, it

will face resistance that will either impede its introduction by a normative act or damage its execution in reality.

2. Preparation and adoption of necessary changes in the legal framework. The analysis of the normative basis of quality in health care (section 2.1) shows that in order to introduce a system of quality measurement and evaluation that meets the needs of quality management, normative changes are needed to synchronize quality concepts and approaches to quality measurement (based on international understanding); to regulate the role of institutions and organizations in the health care system in introducing quality measures and in its evaluation; to introduce obligations and mechanisms for

3. Creating an infrastructure for the quality measurement and assessment system that enables for systematic and periodic data collection and quality evaluation, as well as studies that can be utilized to build the quality measurement and assessment system itself.

4. Provide public access to data for assessing the quality of health care and the quality provided in health facilities. In addition to informing citizens' choice of health care facilities, the public availability of health care quality assessment data should be used as a way to increase public trust in the health care system and medical professionals.

Conclusion

There are serious persistent problems with the quality of health care in Bulgaria proven over the years in a number of analyses by Bulgarian and foreign experts, requiring effective management of the health care system and health care institutions with a focus on quality. A basic prerequisite for this is the availability of opportunities for systematic and periodic measurement and evaluation of quality at the national level and at the level of individual organizations in the healthcare system. In Bulgaria, there are currently individual - sporadic and partial - attempts and conditions for measuring and evaluating quality that do not allow for its improvement. Therefore, as our study shows, there is a need to introduce a national system of indicators for quality measurement and assessment, which would use, but also significantly build on, the criteria and indicators set out in the legal framework, in accordance with internationally accepted concepts of quality in healthcare, create an organization for periodic and systematic collection of the necessary data and provide a reliable assessment that would serve the citizens, medical professionals and healthcare institutions and the health.

In addition to the need to establish a system for quality measurement and evaluation and the available prerequisites for it, which are laid down in the current legal framework and previous experience, our research shows that there is also the necessary support from the most important stakeholders in healthcare - citizens and medical professionals.

Key deficits in the healthcare system related to the provision and distribution of human resources, their qualification and motivation, financing and the overall organization of the healthcare system emerge as obstacles in providing quality medical care. Therefore, the system of indicators for quality measurement and evaluation, along with those reporting on the efficiency and adequacy of medical activities, should also include those measuring the necessary conditions for quality in the priority problem areas of the health system.

Patient/citizen satisfaction and medical professional satisfaction emerge as integral indicators essential for evaluation.

In order to build an effective system of indicators for measuring and evaluating the quality of healthcare in Bulgaria and to successfully put it into practice, it is necessary to involve a wide range of stakeholders as participants in this process. In addition to management purposes, the system of quality measurement and evaluation indicators should also be seen as a means to increase the trust of citizens and medical professionals in the health system and their trust in each other, because this is also an important prerequisite for quality in health care.

IV. REFERENCE FOR THE DISSERTATION CONTRIBUTIONS

Theoretical

1. Based on the analysis, systematization and generalization of the concepts of quality in health care, the understanding of the different levels of definition of quality (quality of and quality in health care) is further developed and justified, and a link is made between this understanding of quality and the concept of evaluation of the functioning of health systems.

Theoretical and applied

2. The current opportunities for measuring the quality of healthcare in Bulgaria provided by the regulatory framework and available data are analyzed and the needs for changes in existing regulations and the provision of additional information and data are justified.

3. The perceptions and attitudes of citizens and medical professionals and senior managers towards the quality of healthcare in Bulgaria and its measurement are studied and their information needs are identified.

4. A conceptual model of the system of indicators for measuring and evaluating the quality of healthcare in Bulgaria has been developed, containing the key dimensions of healthcare quality with an emphasis on ensuring the quality of medical care for each patient, and sets of indicators for measuring each dimension have been compiled.

5. An approach for introducing a quality measurement and evaluation system in Bulgaria is proposed.

V. PUBLICATION, RELATED TO DISSERTATION

Nikolova, V. (2020). Dimensions and Indicators of Quality of Health Care Used for Healthcare Systems' Performance Assessment Health Economics and Management. 2020;1(75):27-35.

Nikolova, V. Continuity of care - one of the dimensions for measuring the quality of medical care in the assessment of health system functioning. Proceedings of the Jubilee International Scientific Conference of Economic University-Varna. 2020;4:263-274.

Nikolova, V. (2021). Indicators of Quality of Primary Care Used in Health Systems Performance Assessment. *Conference paper of 1st International Scientific Conference of Primary Care*. EQuIP. Ljbljana.