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## THE QUATERNARY PREVENTION IN THE WORK OF PRIMARY HEALTH CARE PHYSICIANS – LITERATURE REVIEW

**Abstract:** The concept of quaternary prevention was integrated in 1999. into the international WONCA vocabulary as actions taken to identify patients at risk of over-prescribing drugs and diagnostic procedures that would do them more harm than good. The aim was to determine the place and role of quaternary prevention in primary care. The papers published until 31.12.2022. have been analyzed. We searched Medline, PubMed, Cochrane Library, Scopus, Google Scholar, Science Direct, Mendeley, Serbian medical journals, books, strategies, and doctoral theses. The terms we used were: quaternary prevention, general medicine, over-medication, and diagnostic procedures. We restricted ourselves to works written in Serbian, English, and Croatian. Search has been performed from 01.09.2022. to 31.12.2022. Preferred Reporting Items for Systematic Review (PRISMA) scale parts were used to determine the validity of the papers collected. A total of 1899 papers were identified. We did not find meta-analyses, systematic literature reviews, and randomized studies. A total of 194 were analyzed. Highlighted as relevant 36. Quaternary prevention in primary care refers to the overuse of radiological and laboratory examinations, antibiotics, screening, individual patient access, good communication, reliance on evidence-based medicine, the workload in teams of selected doctors, and prompt consent to patient requests. Some sick patients are undiagnosed, concerned about their health, with functional problems, psychosomatic disorders, and unusual behavior during illness. Quaternary prevention has a place in breast and prostate cancer screening, immunization, mental health and osteoporosis drug marketing, hypertension, prediabetes, and dyslipidemia, a private health insurance program, and the use of high-resolution diagnostic technology.

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The most powerful way to avoid unnecessary medical procedures is to consistently apply evidence-based medicine.

**Keywords:** Quaternary prevention, evidence-based medicine, ethics, preventive medicine, primary healthcare.

## *Introduction*

The concept of quaternary prevention was integrated into the international dictionary of general/family medicine by the World Organization of Family Doctors (WONCA) in 1999. It is defined as actions taken to identify patients at risk of overmedicalization, protect them from new medical invasion, and propose ethically acceptable interventions<sup>1</sup>. The concept was proposed by Leavell and Clarke in 1948, initially based on the levels of prevention for syphilis in all its stages and later developed in the context of the doctor-patient relationship<sup>2</sup>. The term “quaternary prevention” originated in Belgium in 1986, was established by Marc Jamouille, completed by Jacques Bury in 1988, and began to spread at the WONCA Congress in Hong Kong in 1995<sup>3</sup>.

Primordial prevention involves the socio-economic status of a country and its population, the level of societal awareness, knowledge, preparedness, and the functioning of the healthcare system regarding the harmfulness of certain factors on the overall health status of the population. Preventive measures are categorized into primary, secondary, and tertiary prevention. In recent years, the classification has been extended to include the concept of quaternary prevention, which refers to measures taken to protect individuals (patients) from medical interventions that may cause more harm than benefit<sup>4</sup>.

In primary prevention, there is no disease. Preventive measures focus on a healthy lifestyle and vaccination. In secondary prevention, certain conditions are identified as risk factors, but it is debatable whether they should be considered diseases in themselves, as they are defined by arbitrary thresholds along a continuum (hypertension, diabetes, osteoporosis, hypercholesterolemia). Additionally, early stages of diseases detected through screening are included. At this stage, we have patients who feel perfectly well except for being aware of their condition. The purpose of secondary prevention is to reduce risk factors and mitigate some of the ultimate outcomes of these conditions, such as myocardial infarction, stroke, or bone fractures. Taking a critical view, treating hypertension is prevention, even though there is no disease. The concept of risk factors is relatively new but has gained widespread popularity in a relatively short time<sup>5</sup>.

Most patients with risk factors will never develop the complications associated with those risks. Regardless, we label such individuals as having chronic diseases or comorbidities if they have multiple risk factors. We should not scare our patients by telling them that life itself is a risk factor for death when it is a predisposition. Risk

factors are relative. For example, we should not treat hypercholesterolemia as a risk factor in itself if the overall risk for cardiovascular disease is low, and vice versa. Another example of secondary prevention is prostate cancer screening. Most men with a prostate-specific antigen (PSA) level above 80 will have cancer, but only a few will die from it<sup>6,7</sup>.

Prevention is the only point where disease and the patient’s sense of illness intersect. An example can be acute myocardial infarction. Assisting the patient in managing uncertainty with all the measures available, provided that it makes sense following the patient’s circumstances and will.

Among the four areas of prevention defined based on the interaction between patients and physicians, the quaternary level of prevention refers to a situation in which the patient feels ill, but the doctor concludes that no disease is present. Quaternary prevention involves activities aimed at protecting individuals from medical interventions that would cause more harm than benefit<sup>8</sup>. The WONCA poster on quaternary prevention from the conference in Prague in 2013 has been translated into several Asian and European languages<sup>3</sup> (Figure 1).

**Figure 1. The patient-doctor relationship arises from four types of preventive activities. The arrow indicates that P4 influences all forms of preventive activities**

<p>I Primary prevention</p> <p>measures to avoid or remove the cause of a disease in an individual or population before it occurs. It includes health promotion and specific protection (e.g., immunization).</p>	<p>II Secondary prevention</p> <p>detection of diseases in their early stages, facilitating treatment, reducing and preventing their spread, or mitigating their long-term effects (screening, case finding, and early diagnosis).</p>
<p>IV Quaternary prevention</p> <p>identification of patients or populations at risk of excessive medicalization, aiming to protect them from invasive medical interventions and provide them with ethically acceptable procedures.</p>	<p>III Tertiary prevention</p> <p>activities aimed at reducing the chronic effects of a health problem by minimizing functional impairment (e.g., preventing complications of diabetes). It also includes rehabilitation.</p>

Source: Jamouille & Roland (1995). Wonca dictionary 2003.

According to the authors, the quadrant where quaternary prevention used to be is not empty; instead, it is occupied by patients who feel ill despite the absence of disease (medically unexplained symptoms, functional disorders, distress syndrome), which stigmatizes them and creates functional limitations<sup>4</sup>. This is the only situation where patients feel ill even though there is no disease present (Jamouille)<sup>3</sup>. A typical example is a patient with biomedically or psychiatrically unexplained symptoms. Prevention would mean that the physician refrains from performing potentially painful and invasive tests on such patients. According to Martins, patients in the remaining three quadrants are also at risk of excessive medicalization, and they also require protection from unnecessary interventions and medication use<sup>4</sup>. Quaternary prevention was endorsed by the European Association of General Practitioners (UEMO) in 2011<sup>8</sup>. It is not a tool or technique but a way of seeing the world and ourselves as doctors and how medicine should be practiced<sup>9</sup>.

### ***Objective***

To determine the place and role of quaternary prevention in the work of primary healthcare physicians and conduct a systematic review of the literature on this topic.

### ***Method***

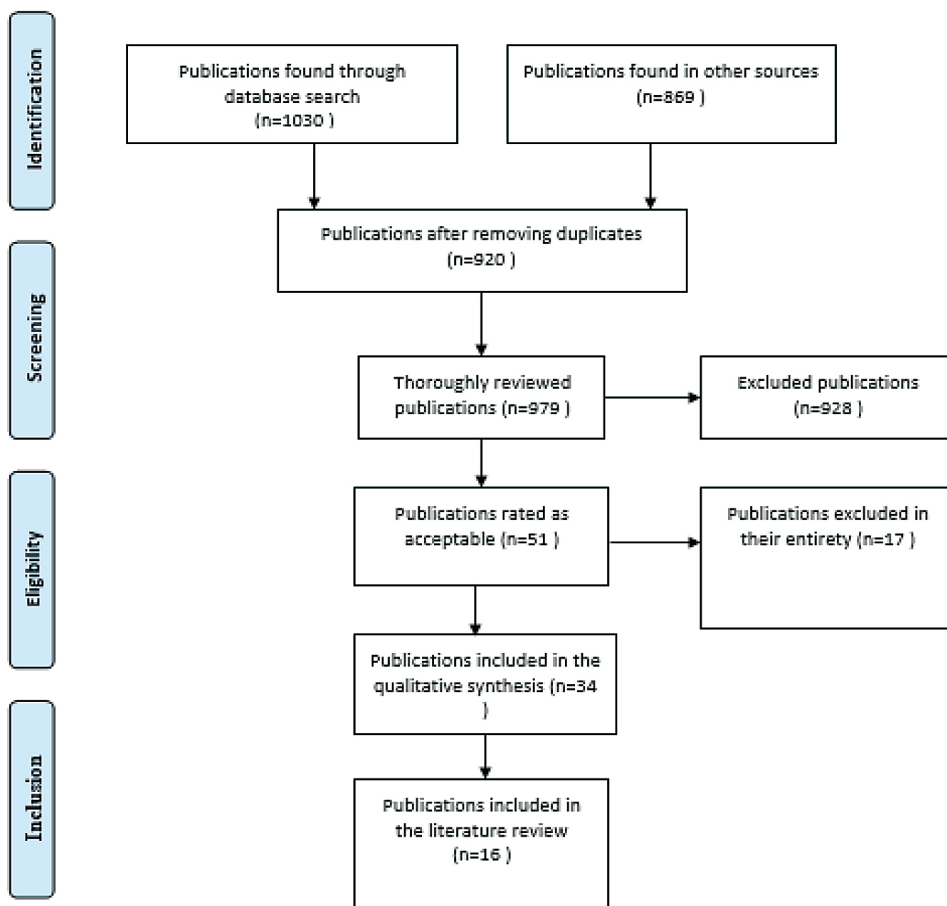
We followed the PRISMA (Preferred Reporting Items for Systematic Review) protocol guidelines for reporting literature reviews. The selection of content for the literature review was defined by using key terms from the Medical Subject Heading (MeSH) list of the Index Medicus for the analyzed topic and the selection of documents when searching international databases. Domestic databases were searched using key terms in the native language. The first step involved an initial exploratory search to select appropriate available reference citation databases, followed by an analysis of recommended terms in the title, abstract, and list of keywords. The search was limited to works written in Serbian and English. As a source of data in the Serbian language, the search included the Kobson, Scindex, and Cobiss databases.

The second methodological step involved specifying strategies to resolve disagreements between two independent reviewers regarding the relevance of literature units, which was overcome through discussions about each uncertainty regarding the inclusion of controversial texts. Documents that did not contain the relevant information sought through abstract or full-text review were excluded from the study. False-positive results were removed. All search results were merged into a single entity. Once the search was completed, the collection of full-text articles commenced. For the processing and analysis of the obtained data, we employed methods of empirical qualitative content description relating to the identified state in practice. We used counting and percentages to present the collected data.

### Results

The total number of papers found in the databases was 1,899. 869 duplicates were removed, and 1,030 publications were included for full-text review. After removing duplicates, 979 documents were excluded from the study. We eliminated 928 publications as irrelevant because they did not focus on the topic, were not relevant to our research, had inappropriate research methodology, or lacked the full text. We considered 51 publications as eligible. From the analysis, an additional 17 publications were excluded as they did not mention primary healthcare, repeated previous results, or provided recommendations to healthcare professionals. 34 publications were included in the qualitative synthesis, and 16 publications were included in our analysis (Figure 2).

**Figure 2. The flow of information through different stages of the literature review.**



The analyzed papers were published until December 31, 2022, and were searched in Medline, PubMed, Cochrane Library, Scopus, Google Scholar, ScienceDirect, Mendeley databases, Serbian medical journals, books, strategies, and doctoral dissertations. The search was conducted from January 1, 2019, to March 31, 2019, by two independent researchers. The period during which the papers were reviewed covered September 1, 2022, to December 31, 2022. The search included meta-analyses, systematic reviews, randomized controlled trials, cohort and longitudinal studies, original scientific papers, review articles, case reports, editorials, doctoral dissertations, and practice guidelines. Medical Subject Headings (MeSH) terms from the Index Medicus list were used for the search: quaternary prevention, primary healthcare, family medicine, overuse of drugs, overuse of diagnostic procedures, general medicine, and general practitioners<sup>10</sup>. Previously published papers on this topic were selected. False positive results that did not use these terms were excluded. The search results were consolidated to eliminate duplicates. After completing the search of bibliographic databases, full-text papers (in extenso) were collected. Subsequently, the reliability and validity assessments in the collected papers were searched using the Strength of Recommendation Taxonomy scale<sup>11</sup>.

**The concept of quaternary prevention** serves as a response from the family doctor facing overmedicalization, as a resistance, rallying against the lack of humanity within the entire medical sector, and their institutional corruption<sup>12</sup>. Quaternary prevention entails the need for careful supervision by the physician themselves, a form of ongoing quality control in the name of awareness of the harm they can unintentionally inflict upon their patients. Quaternary prevention implies an understanding that medicine is based on a relationship and that this relationship must remain genuinely therapeutic, respecting the autonomy of patients and physicians. It is used as a framework for repositioning current issues and limitations in medical practice: disease mongering, expanding the market for attention deficit hyperactivity disorder, transforming symptoms into diseases, marketing osteoporosis, breast cancer epidemiology, and screening, health-related side problems, influenza and human papillomavirus immunization, drug marketing in mental health, hypertension or dyslipidemia, as well as empathy and communication, including medically unexplained symptoms<sup>13</sup>. The theoretical foundation for the development of the concept of quaternary prevention can be applied at all levels of healthcare. However, its primary and most crucial position is in family/general medicine due to the physician's role as the first point of contact with the patient and their guide through the healthcare system<sup>14</sup>.

General practitioners encounter non-selected patients with a low prevalence of manifest disease<sup>15</sup>. They advocate for practicing quaternary prevention during each patient visit and being specially trained for this complex situation from a sociological and psychological standpoint, which are essential for adherence, lifestyle changes,

and the overall sense of having a doctor who understands their desires, fears, anxiety, and can adapt to their patient's needs<sup>16</sup>. In primary healthcare, quaternary prevention relates to the excessive use of radiological and routine laboratory tests, antibiotic use, unfounded screenings, individualized patient approach, good communication, a balance between testing and evidence-based medicine, increasing workload in primary care teams with short consultation times, which determines a quick acceptance of patient demands. There are also patients without a diagnosis, overly concerned about their health, patients with functional symptoms, psychosomatic disorders, and unusual behavior during illness.

Prevention has its place in the epidemiology and screening of breast and prostate cancer, influenza and HPV immunization, marketing of mental health and osteoporosis medications, treatment of hypertension, prediabetes, and dyslipidemia as risk factors without illness manifestation, private health insurance programs, defensive medicine practice due to fear of sanctions, and the use of high-resolution diagnostic technology with the risk of excessive detection of conditions that would never progress to disease. There is a need for healthcare professionals to be educated about all of these aspects. Quaternary prevention is a way of thinking about the overuse of medications, excessive information, unnecessary screenings, overdiagnosis, overtreatment, and potentially avoidable treatment. The challenges of quaternary prevention include patients without a diagnosis, excessive health concerns, complex patients, patients with functional symptoms, somatoform disorders, abnormal behavior during illness, and the list is endless<sup>17</sup>.

**The definition of disease** occurs through two mechanisms: lowering the threshold for risk factors without evidence that it helps people feel better or live longer, and expanding the definition of disease to include patients with ambiguous or very mild symptoms. An example of lowering the threshold would be changing the target value for high blood pressure from systolic >150 to >130 for all adults. Treating risk factors as diseases and lowering the threshold for diagnosis based on risk factors has dramatically increased the prevalence of many conditions, such as the "prediabetes epidemic"<sup>18</sup>.

Excessive definition occurs through two mechanisms:

a) Lowering the threshold for risk factors without evidence that it helps people feel better or live longer. A new category called "pre-risk" (pre-hypertension, pre-diabetes) has recently been introduced in the medical literature.

b) Expanding the definitions of diseases to include patients with ambiguous or very mild issues that could be better managed outside the healthcare system.

By definition, these "new" patients are at lower risk than those diagnosed according to previous definitions. The harmful consequences of overdiagnosis due to excessive definition stem from labeling and treatments (including lifestyle changes)

that provide little, if any, benefit considering the low level of risk, but can have significant physical, psychological, social, and financial consequences.

**The sale of drugs** is a marketing tactic to promote the excessive definition of disease. What characterizes this field is that the alleged “diseases” are unpleasant experiences that most people occasionally have. For example, most people have had trouble sleeping, feeling sad, or difficulty focusing. Excessive drug sales involve shifting the line that separates normal from abnormal so that people with milder symptoms are diagnosed. For a minority of people, these symptoms are intense or debilitating, but for the majority, they are mild or transient. While the former may benefit from diagnosis and medical treatment (in this example, for insomnia, depression, or attention deficit hyperactivity disorder (ADHD)), the latter will not. Disease mongering is a term historically reserved for raising awareness about conditions, which is particularly questionable and typically planned and executed to sell more drugs (it should be noted that diagnosis can help people with more severe symptoms). This has been a central strategy in prominent marketing campaigns for conditions such as low testosterone with aging, restless leg syndrome, eating disorders, ADHD, chronic dry eye disease, and excessively short eyelashes, as a banal example of the aforementioned<sup>19</sup>. Preventing excessive medicalization of patients is a crucial area of action for quaternary prevention. The aging population and the increasing number of chronic diseases inevitably lead to increased drug consumption; however, due to the definition of lower reference values for individual parameters and the growing number of diseases, it sometimes seems that even death and aging are becoming diseases. The influence of the pharmaceutical industry, both directly through marketing and indirectly through physician education, inevitably leads to increased prescribing of a large number of drugs. General practitioners, as bearers of quaternary prevention, should become pioneers of demedicalization. They can empower patients, encourage and support them in self-care, advocate for better and more comprehensive primary healthcare, resist categorizing life issues as diseases, and help make decisions about which complex healthcare services should be available. The patient should be listened to and the life situations that influence their sense of illness should be recognized. This is possible if the most potent means of achieving quaternary prevention is developed: communication and patient trust, which are built over a long period in the complex doctor-patient relationship. The physician’s ability to absorb, interpret, listen to, respect the meaning of the patient’s words, and respond to their narrative, acting according to their wishes and on behalf of the patient, enables them to perform their job professionally and empathetically.

**Diagnostic procedures** unnecessarily turn people into patients without clear benefits and with potential harm by detecting problems that would never harm the



patient or by treating common life experiences. There are two main causes: overdiagnosis and over-definition of disease. Regardless of the cause, the consequences are the same, the establishment of diagnoses that do more harm than good. Overdiagnosis is driven by the idea that detecting diseases at an early stage will always have a favorable impact on the natural course of the disease, but it can reduce the quality of healthcare and compromise patients and public health. Overdiagnosis involves unnecessarily labeling individuals as patients, diagnosing problems that would never cause harm, or medicalizing ordinary life experiences through expanded definitions of disease. Although forms of overdiagnosis may vary, the consequences are the same: diagnoses that ultimately cause more harm than good. Confusion about what constitutes overdiagnosis undermines progress towards a solution<sup>19</sup>.

The use of advanced technology leads to the detection of incidental abnormalities that are unrelated to the true purpose of the test. For example, the adrenal adenoma can be detected during computed tomography of the lungs. Epidemiological data show a surge in early-stage abdominal cancers and small aortic aneurysms without a corresponding decrease in the detection of advanced stages of the disease or mortality outcomes<sup>20,21</sup>. Sophisticated technology can pose a problem when the level of evidence is low that early diagnosis improves treatment outcomes. Such is the case with thyroid cancer in South Korea, where the incidence of cancer increased 6.4 times from 1999 to 2008, but 95% of cases involved changes smaller than 20 mm. They were mostly detected during screening, and mortality remained the same<sup>22</sup>. Similarly, high-resolution computed tomography can identify small subsegmental pulmonary embolisms that do not require treatment<sup>23</sup>. Quaternary prevention also refers to unjustified screening, such as in the case of prostate cancer.

Disease detection is the identification of abnormalities in healthy individuals that would never cause clinically relevant illness or death, either through clinical practice or screening programs. These abnormalities would never cause harm, do not progress or progress too slowly to cause symptoms or disease throughout the patient's remaining lifetime, or spontaneously disappear<sup>24</sup>. The cause of over-detection is the increased use of self-testing technologies, greater availability of tests, and, in some cases, commercialization of the same. The more tests are performed, the higher the probability of detecting a disease<sup>25,26</sup>.

Too much healthcare implies excessively inefficient healthcare. The previous term, overdiagnosis, has been used for a limited number of conditions, and although the term originated back in 1955, it is still challenging to define it appropriately<sup>27</sup>. The term too much healthcare encompasses excessive screening of asymptomatic individuals, excessive diagnostic procedures in patients with symptoms, reliance on biomarkers, pseudo-diagnoses, and diagnoses that often lead to prescribing too many medications, some of which are excessively expensive and quickly approved due to marketing, excessive adverse drug reactions, and inadequate monitoring<sup>19</sup>.

## ***Discussion***

Prevention can be viewed as universal (population-based interventions), selective (interventions targeted at vulnerable groups), and indicated (interventions targeted at individuals)<sup>28</sup>. The five levels of prevention have been the focus of studies and evaluations within the scientific community, but little is known about the patient's perspective. The concept of disease prevention is appealing to both physicians and patients. Belief in early disease detection, certain areas of health policy, and financial interests have influenced the popularity of preventive activities and the medicalization of everyday life. The expansion of prevention has led to an increase in the popularity of periodic health examinations, known as routine check-ups<sup>4</sup>.

The growing burden on primary care teams, coupled with short consultation times, often results in physicians quickly acquiescing to patient demands, which can be inappropriate and contribute to excessive medical care. Longer consultation times have been associated with a range of better patient outcomes. A simpler way for physicians to work is to listen to the patient's complaint, convert it into a diagnosis, and prescribe diagnostic procedures and treatment for the requested illness. This is an easy approach that healthcare professionals are familiar with and that patients appreciate. Jamouille proposes a different and more ethical approach to the physician-patient relationship, in which the patient's complaints are listened to and their hidden concerns understood, they are informed about the diagnosis, and the further diagnostic process and treatment are discussed. Then, a shared decision is made with the patient about whether to proceed with treatment or not, based on the doctor's technical knowledge and the patient's ethical values<sup>29</sup>.

## ***Evidence-Based Medicine***

Sackett, the founder of evidence-based medicine, stated that good doctors use both expertise and the best available evidence because each alone is not sufficient<sup>30</sup>. One of the best ways to avoid unnecessary medical procedures is through evidence-based medicine. Understanding the probabilities of benefits and harms from clinical studies can encourage us to omit many diagnostic procedures and medications in line with our patient's preferences. If we remain trapped in the dichotomy of works/doesn't work, we won't be able to omit a drug we prescribed<sup>31</sup>. By taking on the role of focusing on potential iatrogenic harm and closing the cycle, it is possible to reassess all other levels of prevention among physicians and patients. Unrealistic expectations and excessive screenings or treatments can cause suffering. Therefore, promoting informed consent in every preventive medicine action is important, in addition to its traditional use in curative care.

Prevention is based on avoiding unnecessary medical activities, such as screenings recommended in good practice guidelines. An example of this is prostate cancer screening. In the realm of treatment, it can be the unjustified use of antibiotics for upper respiratory tract infections. In rehabilitation, it involves the application of specific therapeutic procedures for nonspecific low back pain, as well as recommending physical activity such as swimming and maintaining an active lifestyle as much as possible in the elderly population, who may already have systemic impairments due to limited physical activity. Marc Jamouille defines health as Health is a state of resistance. It is not just resistance to diseases but resistance to violence and harassment, drugs, exploitation, poor nutrition, pollution, catastrophic housing conditions, the pharmaceutical market, the commercialization of health, and sometimes resistance to medicine itself. As healthcare professionals, we should support patients in their resistance<sup>32</sup>. The primary care/family doctor is the first point of contact with the patient, who brings with them anxiety related to their symptoms and complaints and serves as their guide through the healthcare system<sup>33,34</sup>. There are situations where the doctor discovers and defines the presence of a specific disease while the patient has no symptoms. An example is a repeated fasting blood glucose level above 7 mmol/L, which indicates the presence of diabetes, but the patient has no complaints, meaning it is an asymptomatic phase of diabetes. The doctor declares and informs the patient that they have a chronic disease they will live with for the rest of their life and that they need to change their lifestyle and diet. However, the patient, having no subjective symptoms, may believe they don't need to take any further action.

For a doctor, the most complex situation arises when a patient has numerous complaints that cause difficulties and feelings of illness, yet no specific disease can be identified, making it challenging to determine the appropriate treatment and how to help the patient. In such situations, it is particularly difficult not to take any action. This is exemplified by situations in which the patient's anxiety aligns with the doctor's anxiety. The patient's anxiety stems from experiencing symptoms that have not been confirmed by positive pathological findings from laboratory tests or clinical examinations. The doctor's anxiety results from feelings of failure and uncertainty due to not identifying a pathological condition. Additionally, there is pressure from the patient to define the condition so that something can be done about it. These situations can have different outcomes. The doctor may classify the patient's symptoms as hypochondria, exaggeration, or a psychosomatic disorder. Such patients are prone to falling into the trap (referred to as the "black hole" by the concept's authors) of undergoing numerous unnecessary tests and incurring costs<sup>34</sup>. Patients experiencing symptoms for which the doctor cannot find a disease are candidates for quaternary prevention. Inadequate communication between the doctor and patient, the patient's previous exposure to anxiety-inducing health education

(“Where have you been until now?”), the aforementioned anxiety of the doctor, and the increasingly defensive approach in medicine all lead the patient down a long and exhausting path consisting of a large number of unnecessary examinations and tests, most of which will yield normal results and generally fail to explain the initial complaints<sup>35</sup>. Martins et al. propose a revision of the WONCA definition of P4 and strongly support Brodersen et al., who define P4 as actions taken to protect individuals from medical interventions that would do more harm than good. The authors also advocate for applying the P4 concept to all levels of prevention<sup>4,18</sup>. In a world where health literacy is low, the promotion of quaternary prevention needs to be appropriate. It is not a panacea nor an activity without health risks. In the effort to minimize harm to patients, there is a risk of avoiding some medical interventions from which the patient could benefit<sup>4</sup>.

Quaternary prevention is a sensitive concept. It needs to be learned while keeping in mind that, along with its strengths, there are also threats. The main threat is the possibility of research in this field turning into a ghetto or becoming politicized. As healthcare services have undergone a significant transformation, becoming an industry, one of the main values of medicine, “*primum non nocere*,” has become somewhat of an aberration<sup>36</sup>.

## ***Conclusion***

Despite an extensive review of the literature, our study has certain limitations. We were constrained by the scope of the literature review. There are academic papers that are not available online. There are unpublished analyses. The heterogeneity of study designs and interventions posed a challenge for detailed analysis. Our literature review was limited to the Serbian and English languages.

Based on all the existing research, we can draw the following conclusions:

- Family/general medicine guided by the concept of quaternary prevention is crucial in guiding patients through the complex healthcare system.
- Through detailed patient interviews, taking into account their medical history, life circumstances, and environment, the nature of their complaints can be discerned without necessarily seeking a disease as their potential cause.
- Based on the patient’s complaints and considering the necessity, relevance, and cost-effectiveness of specific interventions, doctors, using evidence-based medicine, make decisions on further steps to be taken with the patient.
- Consistent implementation of evidence-based medicine is the most powerful way to avoid unnecessary medical procedures.

Future research should shift its focus from disease-oriented approaches to the fundamental principles of family/general medicine, where the patient is at the center of attention. Research should start with the hypothesis that health is more than just the absence of disease. Important topics include examining the complex relationships between patients and their family doctors during the treatment of various health problems. New challenges for research include the impact on society with diverse cultural norms, respecting rights to equality and diversity, as well as technological advancements accompanying global societal development.

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