

QUATERNARY PREVENTION IN THE WORK OF A DOCTOR: A MODERN APPROACH AND PRACTICAL ASPECTS

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Objective – unfavorable demographic indicators and the high prevalence of chronic non-communicable diseases highlight the need to strengthen preventive medicine in Ukraine. In this context, the concept of quaternary prevention (P4) is gaining increasing importance, as it aims to protect patients from overmedicalization and unnecessary diagnostic and therapeutic interventions. The implementation of P4 principles contributes to safer, evidence-based, and patient-centered healthcare.

Aim. To theoretically substantiate the role of quaternary prevention (P4) in modern clinical practice and determine its importance for improving patient safety and rationalizing medical interventions.

Materials and Methods. A narrative review with elements of comparative and systemic analysis was conducted. Scientific publications from international peer-reviewed journals (2017–2024), clinical guidelines, and reports of international organizations were analyzed using databases such as PubMed/MEDLINE, Scopus, Web of Science, and Google Scholar. Content, comparative, and structural-logical analysis methods were applied to systematize modern approaches to quaternary prevention.

Results. The analysis of modern scientific literature and clinical guidelines showed that quaternary prevention plays an important role in reducing the risks of overdiagnosis, polypharmacy, excessive screening, and unnecessary medical interventions. The implementation of evidence-based approaches, medication review, and shared decision making improves patient safety and helps optimize healthcare resources.

Conclusions. Quaternary prevention is an important component of modern patient-centred medicine aimed at protecting patients from overmedicalization and iatrogenic harm. The integration of P4 principles into clinical practice contributes to safer, evidence-based and rational medical care.

ЧЕТВЕРТИННА ПРОФІЛАКТИКА В РОБОТІ ЛІКАРЯ: СУЧАСНИЙ ПІДХІД ТА ПРАКТИЧНІ АСПЕКТИ

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Ключові слова: четвертинна профілактика, гіпердіагностика, поліфармація, припинення призначення ліків, безпека пацієнтів, доказова медицина.

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Мета роботи – несприятливі демографічні показники та висока поширеність хронічних неінфекційних захворювань підкреслюють необхідність посилення профілактичної медицини в Україні. У цьому контексті концепція четвертинної профілактики (П4) набуває все більшого значення, оскільки вона спрямована на захист пацієнтів від надмірної медикалізації та непотрібних діагностичних і терапевтичних втручань. Впровадження принципів П4 сприяє безпечнішій, доказовій та пацієнтоорієнтованій охороні здоров'я.

Мета дослідження - теоретично обґрунтувати роль четвертинної профілактики (П4) у сучасній клінічній практиці та визначити її значення для покращення безпеки пацієнтів та раціоналізації медичних втручань.

Матеріал і методи. Проведено нарративний огляд з елементами порівняльного та системного аналізу. Наукові публікації з міжнародних рецензованих журналів (2017–2024), клінічні рекомендації та звіти міжнародних організацій проаналізовані за допомогою таких баз даних, як PubMed/MEDLINE, Scopus, Web of Science та Google Scholar. Для систематизації сучасних підходів до четвертинної профілактики

застосовані методи контентного, порівняльного та структурно-логічного аналізу.

Результати дослідження. *Аналіз сучасної наукової літератури та клінічних рекомендацій показав, що четвертинна профілактика відіграє важливу роль у зниженні ризиків гіпердіагностики, поліпрагмації, надмірного скринінгу та непотрібних медичних втручань. Впровадження підходів, заснованих на доказах, перегляд лікарських засобів та спільне ухвалення рішень покращує безпеку пацієнтів та допомагає оптимізувати ресурси охорони здоров'я.*

Висновки. *Четвертинна профілактика є важливим компонентом сучасної пацієнтоорієнтованої медицини, спрямованої на захист пацієнтів від надмірної медикалізації та ятрогенної шкоди. Інтеграція принципів P4 у клінічну практику сприяє безпечнішій, заснованій на доказах та раціональній медичній допомозі.*

Introduction. Preserving the health of the population is one of the key global challenges of our time because the level of public health directly affects the socio-economic development of the state and the prospects for the existence of society. For countries with a developed health care system, the priority is not only the treatment of diseases, but also the creation of conditions for active longevity, maintaining a high quality of life and preventing premature mortality [1]. Ukraine, integrating into the European space, defines the preservation and strengthening of the health of the population as one of the strategic directions of state policy.

The modern health care system of Ukraine is focused on providing accessible, high quality and fair medical care in accordance with the real needs of the population, financial capabilities and the level of technological development. At the same time, demographic and medical-statistical indicators indicate the presence of serious problems. The health status of the population is characterized by high overall mortality rates (about 18.6 per 1000 population), low life expectancy (about 57 years for men and 71 years for women), as well as a significant natural population decline, which in 2024 was about -8.9 per 1000 population. Such trends indicate a deepening demographic crisis and the need to strengthen the preventive direction of medicine [2]. Of particular concern is the prevalence of chronic non-communicable diseases (NCDs), which cause the vast majority of deaths in Ukraine. Cardiovascular diseases, malignant neoplasms, respiratory and digestive pathologies form the main burden on the healthcare system [3, 4]. The key risk factors for the development of NCDs, as is known, are unhealthy nutrition, insufficient physical activity, smoking, alcohol abuse, metabolic disorders – are modified. Reducing their prevalence can significantly affect the level of morbidity and mortality.

The reform of the Ukrainian healthcare system involves strengthening the preventive component, in particular at the level of primary health care. Population medical examination, pre-nosological diagnostics, assessment of individual and population risks, and the formation of a healthy lifestyle are fundamental tools of modern preventive medicine [5]. An important condition for the effectiveness of these measures is the active participation

of medical professionals in educational activities and the implementation of the principles of a responsible attitude to one's own health.

In this context, the concept of quaternary prevention (P4) acquires particular relevance, the formation of which took place within the framework of modern bioethical and evidence-based medicine. Quaternary prevention aims to protect the patient from excessive medicalization, unwarranted diagnostic procedures, screenings, interventions, and pharmacotherapy that do not improve morbidity or mortality rates and may cause physical, psychological, or social harm [6-8].

In clinical practice, examples of implementing the principles of quaternary prevention include the rejection of unwarranted screening, the rational use of antibacterial drugs, the avoidance of polypharmacy, and excessive diagnosis. Thus, quaternary prevention expands the traditional understanding of preventive medicine, complementing primary, secondary, and tertiary prevention with an ethical and safety dimension. [7, 8]

The modern view of a doctor's activity involves not only active detection and treatment of pathology, but also a critical assessment of the appropriateness of each intervention from the standpoint of evidence, safety, and the interests of the patient [6]. That is why the implementation of the principles of quaternary prevention is an important component of the development of high quality and patient-centered medicine in Ukraine.

The aim is to theoretically substantiate the role of quaternary prevention in modern clinical practice and determine its significance in increasing patient safety and rationalizing medical interventions.

Materials and methods. The study was conducted using review-analytical and conceptual approaches aimed at theoretically substantiating the role of quaternary prevention in modern clinical practice and analyzing its practical aspects in the healthcare system.

Research Design

The work is narrative-review in nature with elements of comparative and systemic analysis. The study did not involve intervention in the treatment process, collection of personal data of patients or conducting experiments, and therefore did not require approval from the ethics committee.

Sources of Information

The study materials were:

- publications in international peer-reviewed scientific journals for 2017–2024;
- clinical guidelines and recommendations of international professional organizations;
- strategic and regulatory documents in the field of healthcare;
- analytical reports of international organizations and national institutions.

The search for scientific sources was carried out in the electronic databases PubMed/MEDLINE, Scopus, Web of Science, Google Scholar using keywords and their combinations: quaternary prevention, overdiagnosis, overtreatment, polypharmacy, deprescribing, patient safety, evidence-based medicine, screening harms.

Analysis methods

The following methods were used in the research process:

- content analysis – to systematize scientific approaches to quaternary prevention;
- comparative analysis – to compare traditional levels of prevention with the P4 concept;
- structural and logical analysis – to form a generalized model of implementing the principles of quaternary prevention in clinical practice;
- analytical generalization – to highlight key problems (hyperdiagnosis, polypharmacy, excessive screening, evidence, communication).

The results of the study are presented in the form of a descriptive analysis of modern approaches to quaternary prevention, systematized examples of clinical situations in a summarized table reflecting the implementation of the P4 principles, taking into account statistical data.

Results and discussion. General disease prevention is the improvement of the health status of the population, namely the duration and quality of life (Fig. 1). The implementation of this goal involves: reducing the incidence rate (thanks to primary prevention measures), early detection of disease states during their latent period (secondary prevention), the emergence of effective prevention measures, progression of disease recurrences among individuals with a clinically established diagnosis (tertiary prevention – dispensary observation), complete cure of some diseases that until recently were considered chronic (peptic ulcers associated with *H. pylori*, viral hepatitis, etc.) – quaternary prevention.

The need to implement the principles of quaternary prevention in clinical practice is justified by many modern studies that confirm the risks of excessive medical care and its potential negative consequences. One of the key problems is overdiagnosis and excessive intervention, which occurs due to the use of highly sensitive diagnostic tools without adequate assessment of the clinical significance of the results. In particular, the problem of “overscreening” is widely recognized in the medical literature, as it can lead to false positive results, patient stress, and additional unjustified interventions [9].

The analysis of modern scientific sources, clinical

recommendations and international strategic documents allowed us to determine that quaternary prevention in the 21st century is gaining not only theoretical, but also practical significance. In the context of the rapid development of medical technologies and the increasing availability of diagnostic methods, new challenges have emerged related to excessive medical intervention. That is why the modern view of quaternary prevention is associated with five key problems: hyperdiagnosis, polypharmacy, excessive screening, the need to adhere to the principles of evidence-based medicine and improving communication with the patient.

1. The problem of hyperdiagnosis. One of the central problems of modern medicine is hyperdiagnosis – the detection of conditions that would never lead to clinically

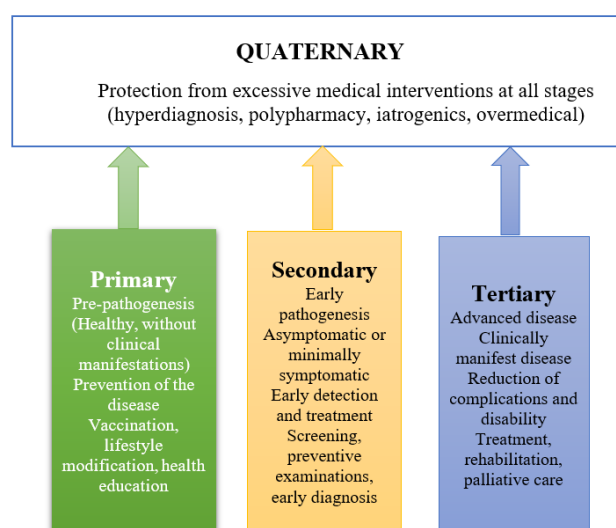


Fig. 1. Relationship between levels of prevention and stages of disease development. Quaternary prevention covers all stages of the disease and is aimed at preventing excessive medical interventions and iatrogenic complications

significant consequences for the patient. The development of highly sensitive instrumental and laboratory methods (MRI, CT, molecular diagnostics, genetic tests) has significantly increased the possibilities of early detection of pathology, but at the same time has contributed to an increase in the number of so-called “incidentals” – random findings, the clinical significance of which is questionable.

Hyperdiagnosis is manifested in:

- mass screening examinations without clear indications;
- expansion of diagnostic criteria (“lowering the thresholds” for establishing a diagnosis);
- formation of “soft” or borderline diagnoses;
- labeling practically healthy individuals as sick.

A classic example is mass PSA screening for prostate cancer, which leads to the detection of clinically insignificant forms of tumors. Some of these cases would never progress and would not affect the patient's life expectancy, but the very fact of establishing the diagnosis

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often triggers a cascade of invasive procedures and treatments with the risk of complications (urinary incontinence, erectile dysfunction, psychological trauma).

International initiatives have demonstrated successful approaches to reducing unnecessary medical interventions. In particular, the Choosing Wisely program has shown positive effects in reducing unnecessary antibiotic prescribing for acute respiratory infections, without increasing adverse patient outcomes [10]. This highlights the importance of using evidence-based guidelines and standards as a P4 tool to optimize clinical practice.

From the standpoint of quaternary prevention, it is important not only to diagnose the disease, but also to assess whether this diagnosis will bring real benefit to the patient. Clinical thinking should include a critical analysis of the feasibility of each study, the ratio of risk and expected benefit, as well as the possibility of active surveillance instead of immediate intervention.

2. Polypharmacy as a challenge to patient safety.

Another significant problem is polypharmacy, which is especially common among the elderly and patients with multimorbidity. Taking five or more medications at the same time is associated with an increased risk of drug interactions, adverse reactions, falls, cognitive impairment, and hospitalizations.

The study found that the causes of polypharmacy are:

- fragmentation of medical care (different specialists prescribe drugs without coordination);
- lack of regular review of treatment regimens;
- focus exclusively on clinical guidelines for individual diseases without taking into account the patient's complex condition;
- patients' expectations of "mandatory" prescription of medications.

Polypharmacy – the simultaneous use of multiple medications – is also a major clinical challenge, especially among older adults. Scientific reviews and studies highlight that polypharmacy often leads to an increased risk of adverse events, including drug interactions, cognitive impairment, and increased mortality [11]. Experts believe that deprescribing (the gradual withdrawal of low-cost or dangerous medications) should become a standard component of clinical practice, as it not only reduces medication burden but also improves patients' quality of life [12].

Quantitative prevention involves the implementation of a systematic review of drug therapy (medication review) and deprescribing – rational cancellation of drugs whose benefit is questionable or minimal. A special role is played by the assessment of the patient's functional status, life expectancy, and quality of life priorities.

Results from long-term observational studies also support the importance of a systematic approach to optimizing pharmacotherapy. For example, one recent study demonstrated that deprescribing could significantly improve functional status in older adults without negatively affecting overall mortality or hospitalizations [13].

It is also important to pay attention to systemic

approaches to medication management that consider polypharmacy as an independent chronic condition that requires structured monitoring and risk assessment [14]. Such a perspective allows for a transition from reactive prescribing of drugs to proactive strategies for optimizing therapy, which meets modern requirements for the safety and effectiveness of medical care.

Thus, the refusal of unnecessary medications is not a sign of insufficient attention, but a manifestation of the doctor's professional responsibility.

3. Excessive screening and diagnostic interventions.

Screening is an effective tool for secondary prevention only if the principles of evidence are followed. However, in practice, there is often a tendency to conduct examinations without sufficient grounds.

Typical examples of excessive screening:

- performing CT or MRI for non-specific back pain without “red flags”;
- regular determination of tumor markers in healthy individuals;
- unjustified complex “check-ups” without individualization of indications.

Such a practice leads to the detection of random deviations that have no clinical significance, but become the basis for additional studies. This forms the so-called “cascade of excessive interventions”, which increases the risk of iatrogenic complications and financial burden.

According to the concept of quaternary prevention, each screening intervention must meet three criteria:

1. Availability of evidence of effectiveness.
2. Prevalence of benefits over potential harm.
3. Informed consent of the patient after explanation of possible consequences.

The problem of over-screening is not limited to laboratory tests or imaging studies. A number of clinical guidelines emphasize that screening programs should be targeted to groups of patients with a high prior probability of disease. Screening a broad population without proven benefit is not only a clinical but also an economic problem, as it increases the burden on the health care system and increases medical waste [15].

4. Evidence-based medicine as a tool for quaternary prevention. Analysis of international approaches shows that quaternary prevention is closely related to the principles of evidence-based medicine. The use of clinical recommendations from leading international organizations allows minimizing the risk of unjustified interventions.

An important role is played by the guidelines of:

- World Health Organization;
- U.S. Preventive Services Task Force;
- the international initiative Choosing Wisely.

The Choosing Wisely initiative deserves special attention, which forms lists of medical procedures and interventions that should not be used routinely. The format “Five things physicians and patients should question” contributes to the development of a culture of critical thinking among both doctors and patients.

The implementation of evidence-based approaches in the national healthcare system allows not only to improve

the quality of care, but also to reduce the number of unnecessary interventions.

5. Communication with the patient as a key component of quaternary prevention. One of the most complex components of quaternary prevention is communication with the patient. The modern model of interaction involves shared decision making, within which the doctor and the patient jointly evaluate possible options for action.

Effective communication includes:

- explaining the potential risks and limitations of diagnostic and therapeutic interventions;

- discussing alternatives, including active surveillance;
- overcoming the “culture of mandatory examination”;
- building trust and partnership.

The role of communication between the doctor and the patient in shared decision making deserves special attention. Current research emphasizes the importance of taking into account the values, preferences and expectations of patients when choosing an examination or treatment strategy, which is a key component of the P4 concept. Such an approach not only increases patient satisfaction, but also helps reduce the risk of unjustified medical interventions.

Table 1

Implementation of the principles of quaternary prevention in clinical practice taking into account statistics

Clinical situation	Potential risk	Approach P4	Result	Statistical data
Thyroid incidentaloma (incidental finding on MRI)	Overdiagnosis, invasive interventions, psychological anxiety	Refusal of unwarranted biopsy, dynamic observation	Invasive procedures and iatrogenics avoided	5–7% of incidental thyroid nodules on MRI are clinically significant; most (~93%) do not require intervention
Polypharmacy in an elderly patient (9 drugs)	Drug interactions, falls, cognitive impairment	Medication review, deprescribing, individualization of therapy	Reduced number of drugs, improved well-being	40–60% of patients ≥65 years old take ≥5 drugs; 25–30% have potentially harmful interactions
Acute nonspecific low back pain	Over-imaging (CT/MRI), “diagnostic cascade”	Refusal of early imaging without “red flags”, symptomatic therapy	Self-healing without additional interventions	Up to 30% of patients receive CT/MRI without clinical indications; only 1–5% have serious pathology
PSA screening without risk factors	Overdiagnosis, overtreatment, complications	Shared decision making, information about risks and alternatives	Informed decision taking into account individual risks	20–50% of prostate cancers detected by PSA are clinically insignificant; 25–30% of men are overtreated
Frequent determination of tumor markers in a healthy person	False positive results, anxiety, unnecessary examinations	Refusal of unjustified screening, orientation to evidence-based recommendations	Reduction of unnecessary tests	False positive tumor marker results in healthy persons occur in 10–15% of cases; ≥50% of examinations without clinical benefit
Prescribing antibiotics for viral infection	Antibiotic resistance, side effects	Explanation of viral etiology, symptomatic treatment	Recovery without antibiotics	30–50% of antibiotic prescriptions in primary care are unjustified; up to 20% of patients suffer from side effects

In many clinical situations, the decision to “refrain from intervention” is the safest and most rational. However, it requires a high level of professional confidence on the part of the doctor and the patient’s willingness to make an informed decision.

Statistical data confirm that most invasive or diagnostic interventions are excessive, especially in case of incidental findings and routine screenings. Polypharmacy and overprescription of drugs are one of the most common problems in geriatrics and family practice. The use of P4 principles allows reducing risks, increasing patient safety

and optimizing the use of health care system resources.

Overall, the concept of quaternary prevention is a scientifically sound and practically significant approach that allows reducing harm from medical interventions, ensuring rational use of resources and increasing patient safety. The implementation of P4 principles should be integrated into national health care strategies, medical education systems and clinical practice as a key element of modern health care.

The results obtained indicate that quaternary prevention is a response to the modern challenges of medicalization of

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society. It integrates the principles of evidence, ethics and safety aimed at protecting the patient from excessive medical intervention.

The implementation of P4 requires:

- a change in clinical thinking;
- a systematic review of diagnostic and therapeutic strategies;
- improvement of the doctor's communication skills;
- support at the level of medical education and national health policy.

Thus, quaternary prevention forms a new paradigm of clinical practice, in which the priority is not the number of

interventions, but their feasibility, safety and real benefit for the patient.

Conclusion. Quaternary prevention is a modern ethical, clinical and socio-economic tool. Its integration into the daily practice of a doctor helps reduce the risks of overtreatment, improve the quality of medical care and form a culture of rational medical intervention that meets the world standards of modern medicine.

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