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The Use of Artificial Intelligence in Medical Diagnostics: Opportunities, Prospects and Risks

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Abstract: *Rapid advancements in AI (artificial intelligence) technologies, including machine learning, natural language processing, and computer vision, have developed sophisticated tools capable of performing complex medical tasks. The AI integration in healthcare can revolutionise the industry by improving patient outcomes, optimising resource allocation, and reducing operational costs. However, the AI use in medicine carries certain risks related to ethics and data privacy, shortcomings in the quality of data for training algorithms, and importance of protecting against cyberthreats. There is also a threat of rising medical costs due to the need for a large number of tests and validations of new technologies. This study focuses on the AI application in the diagnostic field, as it is revolutionising the medical industry by offering new opportunities for accurate disease detection, classification, and prediction of treatment outcomes. The diagnostic field specificity is that any changes in it affect both those medical professionals who directly perform diagnostic procedures and those medical specialists who use the results of diagnostic examinations in their work. The research consists of two stages. Stage 1 is a survey of 119 respondents (medical professionals in Ukraine) about their attitude to the integration of AI technologies in diagnostics. Stage 2 is a study of opinions by 10 experts (medical professionals in Ukraine) about their own assessment of AI risk parameters in medical diagnostics. The survey showed the vast majority of Ukrainian doctors (over 84%) had no experience with AI-based diagnostic systems. Simultaneously, 74% of respondents believe AI can be effective in reducing diagnostic errors, and the future of medical diagnostics is associated with AI. They consider its main advantages to be speed, accuracy, objectivity, and ability to detect diseases at early stages. Respondents argue that AI is the most appropriate for diagnosing cancer, genetic research, and chronic conditions with atypical symptoms. Regarding the risks and barriers to AI introduction in medical diagnostics, at the first study stage, respondents named the high cost of implementation, the need for specialised training, and the possible lack of personal interaction between doctor and patient as the main ones. This opinion was clarified at the second study stage. In particular, 10 experts ranked these risks and potential problems in the following order (from the most to least important): unequal access; dependence on technology; ethical issues; legislative and regulatory challenges; lack of personal contact; bias and inequality; data privacy and security; errors in diagnosis and treatment. To mitigate each of these risks, the article develops a set of recommendations.*

Keywords: artificial intelligence (AI), dependence on technology, medical diagnostics, medical ethics, public health, quality of medical care, unequal access

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INTRODUCTION

The growing demand for healthcare services, driven by ageing populations and the increasing prevalence of chronic diseases, necessitates more efficient healthcare delivery models. Artificial intelligence (AI) has a potential to meet this demand by streamlining processes and enhancing productivity. It is becoming increasingly integrated into many aspects of our lives, offering solutions to complex problems in a variety of industries, including medicine. From neural networks and machine learning to big data analytics, AI is also penetrating various aspects of medical practice, with the potential to revolutionise modern medicine, which is natural and even inevitable. This AI progress opens up new opportunities to improve diagnosis, treatment and patient care, as well as to increase the efficiency of medical research.

AI was first mentioned in 1950, but could not be implemented specifically in medical activities due to the limited nature of early samples (Saenko, 2022). The AI application in medicine has a long history, starting with the first experimental programmes in the 1960s that tried to mimic the clinical thinking of doctors. For example, early systems such as MYCIN, developed in the 1970s to diagnose bacterial infections and prescribe antibiotics, demonstrated the ability of machines to solve complex medical problems. This early success spurred further research and development of intelligent systems that could analyse medical data and provide recommendations to doctors. One of the most impressive examples is the AI use to analyse medical images such as MRI and CT scans. AI can detect pathologies that may go unnoticed by the human eye, thus improving diagnostic accuracy and allowing treatment to be initiated at an early disease stage. Another example is the development of personalised treatment plans using patients' genetic data. AI analyses genomic data to identify mutations that can affect the body's response to certain drugs, enabling doctors to prescribe the most effective treatment. In drug development, companies apply AI to reduce time and costs associated with bringing new medicines to market. AI can identify potential target molecules for treatment of specific diseases, significantly accelerating research and development process. Today, AI systems are able to analyse complex algorithms and conduct self-learning. Therefore, the world is entering a new medicine era when AI will be engaged in clinical practice through risk assessment models, improving diagnostic accuracy and workflow efficiency (Kaul et al., 2020).

Medical developments and research around the world show that the use of this technology in healthcare is very promising. For example, in Oxford, researchers at the John Radcliffe Hospital have proposed a diagnostic system that can detect heart disease better than doctors can. Harvard scientists have developed a "smart microscope" that can detect dangerous infections in blood. The Japanese venture capital company LPIXEL has offered AI-based software that can be used to analyse results of magnetic resonance imaging.

Worldwide, healthcare systems face significant economic pressure, including higher costs and budget constraints. Research on AI economic benefits can provide insights into how these technologies help alleviate financial burdens on healthcare systems. As AI adoption in healthcare accelerates, regulatory frameworks and ethical standards must evolve to address data privacy, bias, and accountability issues. Research in this area is crucial to developing guidelines that ensure safe and ethical AI use.

Providing AI in medical practice can ensure many advantages:

1) AI algorithms can analyse vast amounts of medical data quickly and accurately, leading to more precise diagnoses. This reduces misdiagnoses and unnecessary treatments, thereby saving costs. For instance, a study published in *Nature Medicine* demonstrated that an AI system outperformed radiologists in detecting lung cancer from CT scans, reducing diagnostic errors and associated costs (Leibig et al., 2022).

2) AI can predict patient needs, optimise scheduling, and reduce wait times, lowering operational costs and improving patient throughput. For example, a case study at Stanford Health Care showed that AI-driven scheduling systems significantly reduced patient wait times and improved resource utilisation. It resulted in cost savings (Armitage, 2024).

3) AI-driven automation can handle billing, coding, and inventory management tasks, reducing overhead costs and freeing up resources for patient care. For example, a report by *Accenture* highlighted that AI applications in administrative tasks could save the US healthcare industry up to $150 billion annually by 2026 (Shook & Daugherty, 2024).

4) The individualised approach to treatment made possible by AI can reduce complications associated with ineffective treatment and the cost of supporting patients in cases where their condition requires intensive monitoring and treatment.

The AI implementation in medical practice can also ensure many risks:

1) AI relies on large amounts of patient data, raising concerns about privacy breaches and unauthorised access. Robust data security measures are crucial to mitigate these risks. The healthcare industry experiences

some of the highest rates of cyberattacks, and there are indications that this trend will continue to grow. When considering that the costs of data breaches in healthcare exceed those in all other industries, it becomes clear that the sector is on the brink of a potentially catastrophic wave of cyberattacks (Kost, 2024).

2) AI algorithms can perpetuate biases present in the training data, leading to disparities in care. Monitoring and addressing biases are essential to ensure fair and equitable healthcare delivery. For instance, some publications found that an AI system used in healthcare settings was biased against Black patients, recommending less intensive care compared to equally sick White patients (Chakradhar, 2019).

3) Excessive dependence on AI can undermine healthcare professionals' clinical skills and decision-making abilities, leading to complacency or errors in judgment. Research published in *JAMA Network Open* showed that radiologists relying heavily on AI assistance for image interpretation experienced a decline in diagnostic accuracy (Sima et al., 2024).

4) The costs associated with AI implementation, including infrastructure, training, and integration with existing systems, can be substantial and pose financial challenges for healthcare organisations.

The future of artificial intelligence in medicine promises to be full of innovations and breakthroughs that could radically change the way we treat, diagnose and care for patients. However, the success of this future will depend on the ability to address ethical challenges and ensure that the AI development and implementation in medicine is in the best interests of all parties, including patients, healthcare professionals and society as a whole.

LITERATURE REVIEW

AI algorithms can analyse vast amounts of medical data quickly and accurately, leading to more precise diagnoses compared to traditional methods. That comes from a 2019 study published in *Nature Medicine*. Researchers at Google Health developed an AI system called DeepMind provided by Dvijotham et al. (2023), which was trained to detect over 50 different eye diseases from retinal scans. In their study, the AI system was tested against expert ophthalmologists and found to be as accurate as, if not better than, human doctors in diagnosing these diseases. Specifically, the AI system was able to analyse retinal scans and provide accurate diagnoses for diseases such as diabetic retinopathy and macular degeneration. This demonstrates the AI capability to process large amounts of complex medical data (in this case, retinal images) quickly and accurately, potentially reducing misdiagnoses and unnecessary treatments. This example illustrates how AI algorithms, when trained on extensive datasets and properly validated, can achieve high accuracy in medical diagnostics, thereby enhancing precision and potentially leading to cost savings by avoiding unnecessary procedures or treatments (Dvijotham et al., 2023).

The increasing demand for mental health services, combined with limited funding and resources, presents an opportunity for innovative technological solutions like AI. It can optimise resource allocation by predicting patient needs, optimising scheduling, and reducing wait times. This efficiency can lower operational costs and improve patient throughput. The research by Dawoodbhoy et al. (2021) aims to identify challenges in patient flow within mental health units and explore potential AI interventions, aiming to develop a model for their integration into service delivery. This study conducted pilot interviews and proceeded with 20 semi-structured interviews involving experts in AI and mental health. Findings reveal inconsistencies in predictive variables for length of stay and readmission rates across the literature. The analysis highlighted multiple areas where AI could enhance patient flow. Firstly, it streamlines administrative tasks and optimises resource allocation. Secondly, through real-time data analytics, the system supports the clinical decision-making in triage, discharge, diagnosis, and treatment. Thirdly, it envisions long-term solutions like digital phenotyping to shift mental health care towards a more proactive and personalised approach.

Kilanko (2023) examines how AI has a potential to revolutionise global medical billing processes. With healthcare systems encountering more complexities and challenges, AI introduces innovative solutions to streamline billing operations, improve accuracy, and enhance financial outcomes. AI-driven systems for coding accuracy analyse medical records to recommend appropriate billing codes, thereby reducing errors and minimising claim rejections. Additionally, AI can optimise reimbursement strategies by leveraging historical data to identify patterns that ensure healthcare providers receive optimal reimbursement rates. In response to concerns about healthcare fraud, AI algorithms analyse extensive datasets to detect suspicious patterns and flag potentially fraudulent activities, mitigating financial losses.

Researchers at Mount Sinai Health System in New York developed an AI model called "Deep Patient". It analyses electronic health records to predict patient outcomes and recommend personalised treatment plans (Miotto et al., 2016). The AI model was trained on a dataset of over 700,000 patient records and learned to identify patterns and correlations that human doctors might overlook. In the study by Miotto et al. (2016), Deep Patient demonstrated its ability to predict patient outcomes such as readmissions, prolonged hospital stays, and mortality rates more accurately than traditional methods. By analysing a wide range of patient data including demographics, medical history, lab results, and imaging reports, Deep Patient generated personalised treatment recommendations tailored to individual patient characteristics. This approach not only improves the precision of treatment plans but also has a potential to reduce the overall cost of care by preventing complications and unnecessary interventions. By proactively addressing patient needs based on AI-generated insights, healthcare providers can optimise resource allocation and enhance patient outcomes while potentially lowering healthcare costs.

The AI transformative capability in medical research highlights its potential to drive advancements in healthcare, improve patient outcomes, and optimise resource allocation in the pharmaceutical sector. For example, Zhavoronkov et al. (2019), researchers from Insilico Medicine, used AI to identify a new anti-fibrosis drug in just 21 days. Traditionally, this process would take months or even years using conventional methods. The AI system employed by Insilico Medicine analysed large datasets, including genomic data, molecular structures, and existing drug databases, to identify compounds with the potential to treat fibrosis. The AI algorithm not only accelerated the identification of potential drugs but also predicted their efficacy and safety profiles based on molecular interactions and biological pathways. This rapid screening process enabled Insilico Medicine to streamline the drug discovery pipeline significantly (Zhavoronkov et al., 2019).

Concerns about AI and patient data security come from an incident involving the University of California, Los Angeles (UCLA) Health System in 2015 (Vinton, 2015). In this incident, the UCLA Health System experienced a data breach where hackers gained unauthorised access to significant patient data, including sensitive medical information such as diagnoses, treatment histories, and personal identifiers. The breach affected approximately 4.5 million individuals and underscored vulnerabilities in healthcare systems' data security protocols. The incident sparked concerns about patient data security in healthcare settings, mainly as AI applications increasingly rely on large datasets for training algorithms and making clinical decisions. The breach at the UCLA Health System demonstrated potential consequences of inadequate data security measures, including the risk of privacy breaches and unauthorised access to sensitive medical information. To mitigate these risks, healthcare organisations and AI developers must prioritise robust data security measures, including encryption, access controls, audit trails, and regular security assessments. Ensuring compliance with healthcare regulations such as HIPAA (Health Insurance Portability and Accountability Act) is essential to protect patient confidentiality and maintain trust in AI-driven healthcare innovations. This example underscores the critical importance of implementing stringent data security protocols to safeguard patient data and mitigate the risks associated with AI applications in healthcare.

Researchers at Stanford University (Obermeyer et al., 2019) investigated a widely used commercial AI system that was designed to assist healthcare providers in making decisions about patient care. The study found the AI system exhibited racial bias in its recommendations for healthcare treatments. Specifically, the AI system recommended less intensive care for Black patients compared to equally sick White patients. Upon further analysis, researchers discovered that the bias stemmed from the data used to train the AI system. The dataset primarily consisted of medical records from predominantly White patient populations, leading the AI algorithm to learn and perpetuate biases present in the data. As a result, the AI system recommendations reflected these biases, potentially leading to disparities in care based on race. This study underscores the importance of monitoring and addressing biases in AI algorithms used in healthcare. Without careful attention to the diversity and representativeness of training data, AI systems can unintentionally perpetuate inequalities and disparities in healthcare delivery. Addressing biases in AI algorithms is crucial to ensuring fair and equitable treatment for all patient populations. This evidence highlights the need for rigorous evaluation and mitigation strategies to minimise biases in AI systems deployed in healthcare settings, thereby promoting more inclusive and equitable healthcare outcomes.

Practitioners may develop excessive dependence on any robust AI system, regardless of its interpretability, potentially falling prey to automation bias (Goddard et al., 2012; Quinn et al., 2020). This over-reliance, whether intentional or subconscious, can result in adverse patient outcomes due to erroneous healthcare decisions, excessive diagnosis and treatment, and defensive medical practices (Carter et al., 2016). The study by Rezazade Mehrizi et al. (2023) focused on the AI use-assisted diagnostic tools in radiology, specifically examining how radiologists' performance and decision-making were affected when using AI for interpreting medical images. Researchers found that when radiologists used AI to aid in their diagnoses, there was a tendency for them to become overly reliant on the AI system recommendations. This over-reliance led to a decrease in the radiologists' own diagnostic accuracy and judgment.

Initial costs associated with AI implementation, including infrastructure, training, and integration with existing systems, can be substantial and may pose financial challenges for healthcare organisations (Wolff et al., 2020). The obstacles posed by regulatory differences and the varying complexities of healthcare systems across different regions could impede the AI smooth integration and its potential economic advantages. Moreover, the strategic evolution catalysed by AI suggests its economic influence extends beyond healthcare alone. The AI complex interaction with market dynamics and regulatory environments necessitates a nuanced exploration of its economic implications. Such a thorough examination will assist stakeholders in strategic planning, investment choices, as well as provide deeper insights into the economic opportunities and obstacles within a healthcare landscape driven by AI (Al Meslamani, 2023).

A 2021 study published in *The Lancet Digital Health* highlights the regulatory challenges posed by rapid advancements in AI healthcare technologies. The study discusses how AI-based medical devices often advance faster than the existing regulatory frameworks can adapt, leading to significant uncertainty as to their legal and ethical use. The researchers emphasise the need for updated regulatory guidelines to keep pace with technological advancements, ensuring AI tools are safely and ethically integrated into medical practice. They also call for international cooperation to harmonise regulations across different regions to avoid fragmentation and ensure a consistent approach to AI governance in healthcare (Yu et al., 2021).

The AI integration into the healthcare industry requires significant investments in technology, education and infrastructure, as well as development of ethical standards and regulations to protect patient data. However, the potential benefits of AI in healthcare, such as increased efficiency of medical services, reduced healthcare costs, and improved patient outcomes, far outweigh the potential risks that need to be explored and mitigated.

METHODOLOGY

In modern medicine, AI is used in a wide range of applications, from diagnostics and personalised treatment to drug development and patient flow management. AI is helping to significantly improve the accuracy of diagnostic images, enabling doctors to detect diseases at early stages. AI-powered personalised medicine helps to develop individualised treatment plans based on a patient's genetic characteristics and health status. In the field of drug development, AI reduces research time and costs by analysing potential molecules to create new drugs. Besides, artificial intelligence is making a significant contribution to improving logistics and management in healthcare facilities, optimising staff performance and enhancing patient experience. The main areas where AI can be most appropriate in medicine are shown in Table 1.

Table 1. Main Areas of AI Application in Medical Spheres

Area of medicine	Sphere of AI application	Expected economic effects
Diagnostics	Automation of comparing data from medical diagnostic systems and objective patient complaints, combining and analysing them to establish the most appropriate diagnosis. Using machine vision algorithms to analyse medical images (MRI, CT, X-rays).	Reducing the time to diagnose, providing more accurate analysis of the initial data, saving resources of a healthcare expert. Machine learning algorithms can analyse laboratory test results. They may detect abnormalities and diagnose diseases at early stages, which will prevent the spread of dangerous diseases and improve public health.
Optimising treatment processes	Analysing genetic, clinical and other patient data to develop individualised treatment plans, which significantly increases their effectiveness. AI can be used to develop new drugs.	Improving the accuracy of laboratory data analysis, reducing the likelihood of error. Accelerating the development and testing of new medicines, decreasing time to market and research costs.
Improving healthcare services	Optimising the work of medical institutions. Chatbots and virtual assistants are enhanced as well.	Managing patient flow, appointments, medical staff schedules. Reducing wait times for patients and increasing overall productivity. Providing information support to patients, answer frequently asked questions, and even perform initial diagnostics. Decreasing the workload of healthcare experts.

Table 1 (cont.). Main Areas of AI Application in Medical Spheres

Area of medicine	Sphere of AI application	Expected economic effects
Analysing big data	Predicting disease outbreaks. Evaluating effectiveness of treatment methods.	By analysing trends and patterns via big data, AI can predict outbreaks of infectious diseases. It assists healthcare facilities and public health authorities in preparing for and preventing their spread. It evaluates the effectiveness of various treatments and medical interventions, contributing to the continuous improvement of medical practice.

Source: Based on authors' own considerations

This study focuses on the AI application in the diagnostic field, as it is revolutionising the medical industry by offering new opportunities for accurate disease detection, classification, and prediction of treatment outcomes.

Specificity of the diagnostic field is that any changes in it affect both those medical professionals who directly perform diagnostic procedures and those medical experts who use results of diagnostic examinations in their work.

Thus, it is important to study the state of affairs and readiness of healthcare professionals to work with AI and take necessary measures to correct ineffective and erroneous perceptions, if any.

This study consists of two blocks:

1) Block 1: A survey of 119 respondents – medical professionals – about their attitude to integration of AI technologies in diagnostics (the questionnaire is presented in Appendix A);

2) Block 2: A study of opinions of 10 healthcare expert on their own assessments of significance degree of the AI use risk parameters in medical diagnostics (the questionnaire is presented in Appendix B).

Research methodology within block 1

The questionnaire is designed to obtain answers to the following aspects:

1) Perception of AI: Assessment of the general attitude towards the AI use in diagnostics, including the level of awareness and openness to new technologies.

2) Benefits and risks: Determining what benefits (e.g., increased diagnostic accuracy, reduced workload for doctors) and risks (e.g., loss of personal contact with patients, potential AI errors) are perceived by healthcare experts.

3) Barriers to implementation: Identification of the main barriers to integrating AI into medical practice, including organisational, technical, ethical, and educational aspects.

The questionnaire contained both closed and open-ended questions. The open-ended questions allowed to collect detailed opinions and beliefs of the respondents. It could be analysed via content analysis methods to identify key themes and patterns in the responses.

Data collection procedure: The questionnaire was distributed through online platforms and in person, ensuring anonymity and confidentiality of responses.

Sample: The respondents were medical professionals in Ukraine from various specialisations, including radiology, neurology, cardiology and others. This provides a broad overview of opinions from different areas of medicine.

In order to analyse the representativeness of the sample, several key aspects need to be considered, such as the total number of survey participants, the distribution of participants by key demographic characteristics (e.g. age, gender), specialisation, region of residence, and length of service.

Specialisation of respondents: The sample includes respondents with a variety of medical specialisations, including psychiatry (36.84%), neurology (15.79%), nursing and laboratory diagnostics (10.53% each), and other specialisations such as otolaryngology, therapy, ophthalmology, internship, and rehabilitation (5.26% each). This indicates a high level of diversity in the sample by specialisation, which allows for a multifaceted view of the AI use in medicine.

Length of service: The sample includes respondents with different lengths of service, balanced between the categories "over 20 years", "up to 5 years", "5-10 years" (26.32% each) and "11-20 years", "over 20 years" (10.53% each). This suggests that the study takes into account the opinions of both experienced healthcare professionals and those who have recently joined the medical community.

Region: All survey participants are from urban areas (100%). This may indicate a potential limitation of the sample in terms of geographical representativeness, as the experience and availability of medical technologies, including AI-based systems, may differ significantly between urban and rural regions.

Overall, the sample demonstrates good representation in terms of specialisation and work experience, which is a positive factor for providing a broad overview of opinions on the AI use in medical diagnostics. However, the absence of participants from rural areas can be identified as a study limitation, which requires additional sample expansion to be more representative.

The total number of respondents who took part in the survey is 119. The sample is sufficient to reflect the diversity of opinions among the group of healthcare experts who use or may use AI in their practice (as indicated by the analysis of the following aspects):

1. Context and target audience: In this case, the study purpose is to analyse the opinions of healthcare experts from different specialisations in the region, i.e. the number of 119 respondents is sufficient to draw conclusions with a high degree of generalisability.

2. Statistical significance and variability: For this statistical analysis, given that the study is of a preliminary screening research nature and does not require high resolution to identify subtle differences between groups, the sample size of 119 is not restrictive and does not require the detection of moderate or insignificant effects.

3. Representativeness of regions and specialisations: As shown, all respondents are from urban areas, which may indicate limited representativeness in terms of regional distribution. In this case, it is important to note at the design stage that respondents from rural areas do not have sufficient opportunities to use modern digital technologies, which in turn requires work on the part of administrative authorities. In terms of specialisations, the sample includes representatives of different fields of medicine, which is a positive aspect.

Thus, the sample is diverse in terms of specialisation and experience of the respondents, and the number of 119 respondents provides a sufficient level of representativeness to generalise the findings to the entire medical community as a screening study. For a more targeted analysis, future studies would benefit from expanding the sample to include more participants, especially from rural areas, and conducting additional analysis to confirm or adjust the initial findings.

Research methodology within block 2

The high cost of technology and insufficient training of medical staff create potential risks that need to be investigated and neutralised before AI is widely implemented in practice at all levels of medicine. Therefore, there is a need for a more detailed study and ranking of potential risks of AI use in the medical field.

The purpose of this study section is to analyse the opinion of the expert medical community on the main risks and potential problems that may arise when implementing AI in diagnostics.

The questionnaire for analysing experts' opinions is provided in Appendix B and contains a description of the most frequently mentioned risks and potential problems that may arise when implementing AI in medical practice:

1) Data privacy and security. One of the biggest risks of using AI in healthcare is maintaining the confidentiality and security of patient data. AI systems require access to large volumes of medical data for training and analysis, which puts patients' privacy at risk, especially in the event of a data breach or cyberattack.

2) Incorrect interpretation of results. Errors in AI algorithms can lead to misinterpretation of medical data, which can lead to incorrect diagnoses or inappropriate treatment recommendations. This is especially dangerous in situations where the patient's life is at stake.

3) Ethical considerations. The AI use in medicine raises ethical issues, such as responsibility for medical errors and the choice between artificial intelligence and human judgement in critical medical decisions. Besides, there is a risk of bias in AI algorithms, which can lead to discrimination against certain groups of patients.

4) Lack of personal contact. Dependence on AI can reduce personal communication between a doctor and a patient, which is an important aspect of medical care.

5) Bias and inequality. The data on which AI algorithms are trained may contain biases that lead to unequal recommendations or diagnostic conclusions, especially among minority and underrepresented groups.

6) Inequality of access. There is a risk that the introduction of AI in healthcare could exacerbate inequalities in access to high-quality medical services. The development and maintenance of advanced AI systems may be too expensive for medical institutions in underfunded or remote regions.

7) Dependence on technology. Increasing reliance on AI and automation may lead to a decline in clinical skills and critical thinking abilities of healthcare professionals, especially when technology systems fail or are unavailable.

8) Legislative and regulatory challenges. The rapid development of AI requires the adaptation of existing legislative and regulatory frameworks to ensure effective oversight and control over the AI use in medicine.

The expert should rate each of these risks on a 5-point scale, where 1 means "Low risk" and 5 means "High risk". Each expert should also rate the importance of neutralising each risk on a 5-point scale according to the consequences that it could have if it were to materialise. The assessments can be repeated.

The research in this section was conducted in the following sequence:

Stage 1. Formation of the expert committee: number of factors (risks) n = 8, number of experts m = 10.

Stage 2. Collecting expert opinions through a questionnaire survey.

Stage 3. Formation of the rank matrix. Experts assess the degree of importance of the parameters by assigning them a rank number. The factor to which the expert gives the highest score is assigned rank 1. If the expert recognises several factors as equally important, they are assigned the same rank number.

Stage 4. Reformatting the ranks. If there are related ranks (the same rank number) in the matrix in the assessments of any expert, then it is necessary to reformat them. In this study, that is done without changing the expert's opinion, i.e., the corresponding ratios (more, less, the same) should be maintained between the rank numbers. Each object in a group of related ranks is assigned a calculated average rank instead of their original individual ranks. This process allows for the correct calculation of statistics, taking into account the repetition of ranks among the ratings. Also, it ensures a fair and accurate ranking, especially in cases where the concordance coefficient is used to analyse the ratings of a group of experts, focusing on the correct accounting of situations with tied ranks.

Stage 5. Based on the new ranks of expert assessments, a new rank matrix is built.

Stage 6. Based on the new rank matrix, the necessary parameters are calculated and a table of the calculated rank matrix is generated.

Stage 7. Analysis of significance of the studied factors.

Stage 8. Assessment of the average consistency degree of all experts' opinions.

Stage 9. If there is a weak consistency degree in experts' opinions, the method of average estimates is used for further analysis of results of collecting expert opinions. The method of average expert estimates is one of the basic statistical tools used to analyse opinions or assessments of a group of experts on a particular issue or set of issues. This method focuses on calculating the arithmetic mean of all ratings received for each question, which allows for a generalised picture of the responses. Based on the results of this method, conclusions will be drawn about the main trend in the distribution of scores, which will reflect the general slope of opinions or preferences of experts. It also assesses the consensus among experts.

Stage 10. Analysis of the results and development of recommendations.

Given these risks, it is important to develop comprehensive strategies to minimise them. In particular, we can include raising data security standards, ensuring transparency of AI systems, developing ethical principles for the AI use in medicine, and providing equal access to technology for all population segments. It is also necessary to prioritise efforts based on the principle of risks that pose a potentially greater threat in terms of economic efficiency and public health.

RESULTS

Research results within block 1

Based on the analysis of the survey participants' responses, the following percentage distribution was obtained for the key questions:

1. Experience with AI-based diagnostic systems. "Yes": 15.79%; "No": 84.21%. This shows that the majority of respondents (84.21%) had no experience with AI-based diagnostic systems.

The distribution of responses is shown in Figure 1.

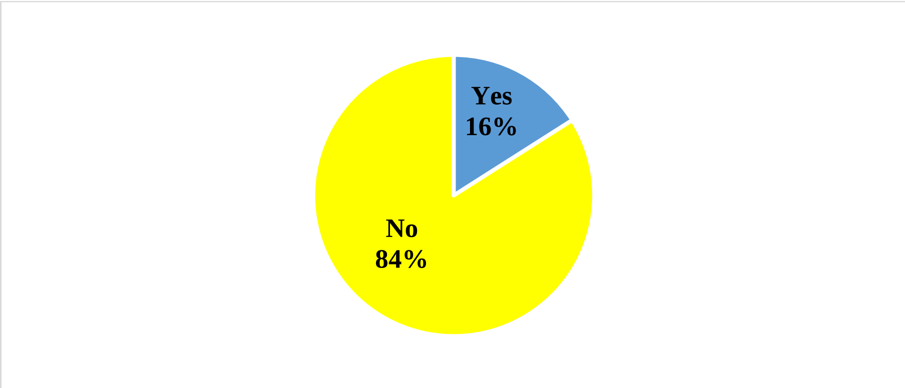

Figure 1. Experience with AI-Based Diagnostic Systems (Responses)

Source: Based on results of authors' survey

2. Effectiveness of AI in reducing diagnostic errors. "Yes": 73.68%; "Not sure": 21.05%; "No": 5.26%. The majority of respondents (73.68%) believe AI can be effective in reducing diagnostic errors while a significant number (21.05%) remain unsure.

The distribution of responses is shown in Figure 2.

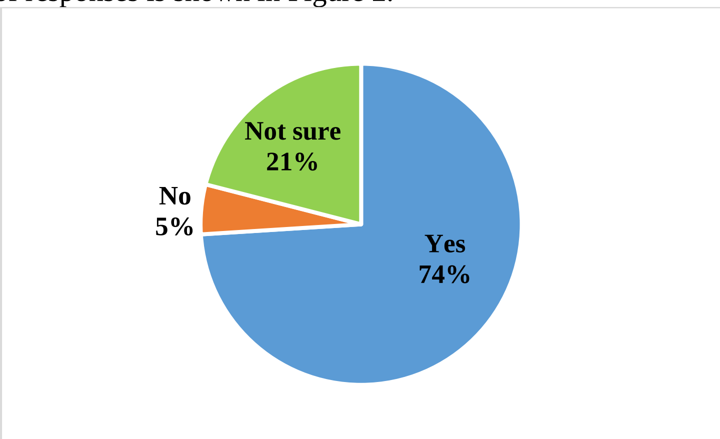

Figure 2. Effectiveness of AI in Reducing Diagnostic Errors (Responses)

Source: Based on results of authors' survey

3. The future of medical diagnostics is connected with AI. "Yes": 73.68%; "Not sure": 26.32%. These percentages further support the conclusion that there is a high interest and positive perception of the AI potential in medical diagnostics among healthcare professionals. Also, it indicates the existence of some uncertainty and the need for further research and education in this area.

The distribution of responses is shown in Figure 3.

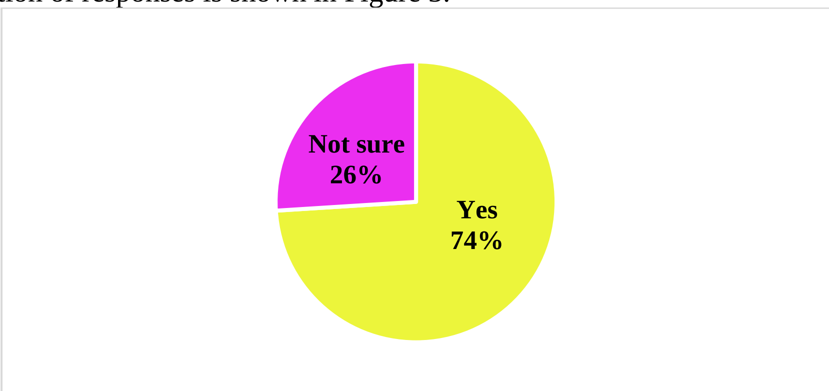

Figure 3. The Future of Medical Diagnostics Is Connected with AI (responses)

Source: Based on results of authors' survey

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Answering the open-ended question "In your opinion, what diseases/conditions are most appropriate to diagnose using AI?", respondents most often mention cancer, genetic research, and chronic conditions with atypical features.

4. Answering the question "To what extent do you think the AI use can improve the accuracy of diagnostics?", most respondents (65.55%) assumed AI can significantly improve the accuracy of diagnostics. Other respondents noted AI can improve the accuracy of diagnostics (34.45%). Thus, all respondents expressed an opinion about the positive impact of the AI use in diagnostic practice to improve the quality of diagnostics.

The distribution of responses is shown in Figure 4.

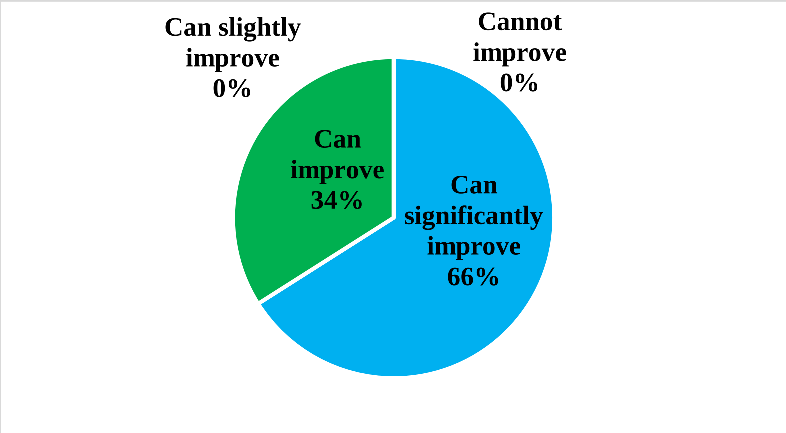

Figure 4. To What Extent Do You Think the AI Use Can Improve the Accuracy of Diagnostics? (Responses)

Source: Based on results of authors' survey

As for the question "Do you think AI can be effective in reducing the workload of doctors?", the answers were divided between the extreme options – "Yes" (75.63%) and "No" (5.04%), with a significant advantage in favour of the affirmative answer. "Not sure" received 19.33% of supporters. Such indicators show respondents' support of the AI effectiveness in medical practice to reduce the workload of doctors.

The distribution of responses is shown in Figure 5.

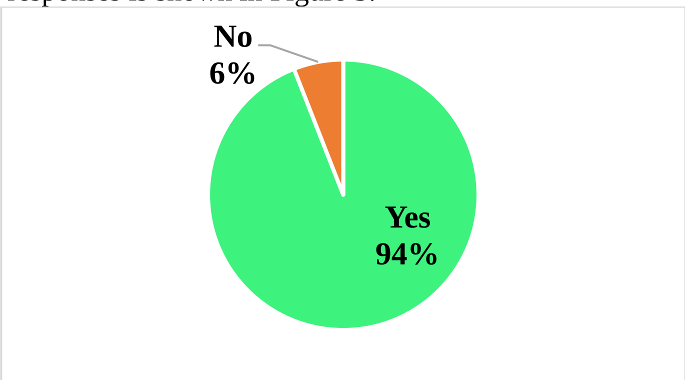

Figure 5. Do You Think AI Can Be Effective in Reducing the Workload of Doctors? (Responses)

Source: Based on results of authors' survey

Answering an open-ended question about the AI advantages, respondents mainly mentioned speed, accuracy, objectivity, and the ability to detect diseases at early stages.

Answering the open-ended question about the risks and barriers to the AI introduction in medical diagnostics, respondents mainly mentioned the high cost of implementation, the need for specialised training, and the possible lack of personal interaction between doctor and patient. The respondents noted the need to develop recommendations at the national and local levels to improve the process of implementing and using AI in medical diagnostics. This should include proposals for educational programmes for healthcare professionals, the development of standards for the evaluation and verification of AI-based diagnostic systems, and strategies for engaging the medical community in discussions about the future of AI-enabled medicine.

Research results within block 2

As noted above, this section of the study included an 8-question questionnaire that was used to investigate the opinions of 10 medical experts on their own assessments of significance degree of AI risk parameters in medical diagnostics.

As part of this study, a rank matrix was generated. Experts assign a rank number to the respective risk (the factor the expert gives the highest score to is assigned rank 1). If an expert considers several factors to be equally important, they are assigned the same rank number. The ranking matrix formed on the basis of this study block results is presented in Table 2.

Table 2. Rank Matrix According to the Survey Data

Number of expert	1	2	3	4	5	6	7	8	9	10
1	2	4	4	4	3	3	3	3	3	5
2	1	3	1	5	3	3	4	5	3	4
3	1	3	3	5	3	5	4	5	4	4
4	1	5	5	5	3	5	2	4	4	3
5	2	3	3	4	3	5	3	3	5	4
6	2	3	5	6	4	3	3	4	4	5
7	2	2	5	5	4	5	3	4	5	4
8	1	5	3	4	5	5	4	3	4	3

Source: Based on results of authors' survey

In the matrix, we have related ranks (the same rank number) in the first expert's assessments, so it is necessary to reformat them. The ranks are re-ordered without changing the experts' opinions, namely the corresponding ratios (more, less, the same) must be maintained between the rank numbers. Each object in a group of related ranks is assigned a calculated average rank instead of their original individual ranks.

The results of reformatting ranks are shown in Table 3.

Table 3. Reformatting Expert Ranks

Number of order places	Factor position by expert's assessment	New ranks
Reformatting the ranks of expert 1		
1	1	2.5
2	1	2.5
3	1	2.5
4	1	2.5
5	2	6.5
6	2	6.5
7	2	6.5
8	2	6.5
Reformatting the ranks of expert 2		
1	2	1
2	3	3.5
3	3	3.5
4	3	3.5
5	3	3.5
6	4	6
7	5	7.5
8	5	7.5

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Table 3 (cont.). Reformatting Expert Ranks

Number of order places	Factor position by expert's assessment	New ranks
Reformatting the ranks of expert 3		
1	1	1
2	3	3
3	3	3
4	3	3
5	4	5
6	5	7
7	5	7
8	5	7
Reformatting the ranks of expert 4		
1	4	2
2	4	2
3	4	2
4	5	5.5
5	5	5.5
6	5	5.5
7	5	5.5
8	6	8
Reformatting the ranks of expert 5		
1	3	3
2	3	3
3	3	3
4	3	3
5	3	3
6	4	6.5
7	4	6.5
8	5	8
Reformatting the ranks of expert 6		
1	3	2
2	3	2
3	3	2
4	5	6
5	5	6
6	5	6
7	5	6
8	5	6
Reformatting the ranks of expert 7		
1	2	1
2	3	3.5
3	3	3.5
4	3	3.5
5	3	3.5
6	4	7
7	4	7
8	4	7
Reformatting the ranks of expert 8		
1	3	2
2	3	2
3	3	2

Table 3 (cont.). Reformatting Expert Ranks

Number of order places	Factor position by expert's assessment	New ranks
Reformatting the ranks of expert 8		
4	4	5
5	4	5
6	4	5
7	5	7.5
8	5	7.5
Reformatting the ranks of expert 9		
1	3	1.5
2	3	1.5
3	4	4.5
4	4	4.5
5	4	4.5
6	4	4.5
7	5	7.5
8	5	7.5
Reformatting the ranks of expert 10		
1	3	1.5
2	3	1.5
3	4	4.5
4	4	4.5
5	4	4.5
6	4	4.5
7	5	7.5
8	5	7.5

Source: Based on results of authors' survey

On the basis of new ranks of expert assessments, a new rank matrix was constructed (Table 4).

Table 4. Matrix of Reformatted Expert Ranks

Number of expert	1	2	3	4	5	6	7	8	9	10
1	6.5	6	5	2	3	2	3.5	2	1.5	7.5
2	2.5	3.5	1	5.5	3	2	7	7.5	1.5	4.5
3	2.5	3.5	3	5.5	3	6	7	7.5	4.5	4.5
4	2.5	7.5	7	5.5	3	6	1	5	4.5	1.5
5	6.5	3.5	3	2	3	6	3.5	2	7.5	4.5
6	6.5	3.5	7	8	6.5	2	3.5	5	4.5	7.5
7	6.5	1	7	5.5	6.5	6	3.5	5	7.5	4.5
8	2.5	7.5	3	2	8	6	7	2	4.5	1.5

Source: Based on results of authors' survey

Via the new rank matrix, the necessary parameters were calculated and a table of the calculated rank matrix was constructed (Table 5).

Table 5. The Calculated Matrix of Ranks

Factors / Experts	1	2	3	4	5	6	7	8	9	10	Sum of ranks	d	d^2
X_1	6.5	6	5	2	3	2	3.5	2	1.5	7.5	39	-6	36
X_2	2.5	3.5	1	5.5	3	2	7	7.5	1.5	4.5	38	-7	49
X_3	2.5	3.5	3	5.5	3	6	7	7.5	4.5	4.5	47	2	4
X_4	2.5	7.5	7	5.5	3	6	1	5	4.5	1.5	43.5	-1.5	2.25
X_5	6.5	3.5	3	2	3	6	3.5	2	7.5	4.5	41.5	-3.5	12.25

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Table 5 (cont.). The Calculated Matrix of Ranks

Factors / Experts	1	2	3	4	5	6	7	8	9	10	Sum of ranks	d	d^2
X_6	6.5	3.5	7	8	6.5	2	3.5	5	4.5	7.5	54	9	81
X_7	6.5	1	7	5.5	6.5	6	3.5	5	7.5	4.5	53	8	64
X_8	2.5	7.5	3	2	8	6	7	2	4.5	1.5	44	-1	1
$\sum$	36	36	36	36	36	36	36	36	36	36	360		249.5

Source: Based on results of authors' survey
Notes: d – deviation of the respective parameter rank from the arithmetic mean of the sum of ranks

$$d = \sum x_{ij} - \frac{\sum \sum x_{ij}}{n} = \sum x_{ij} - 45 \quad (1)$$

X_{ij} – respective assessment of factor X_i by expert j, where 10 experts participate in the following factors:
X_1 – data privacy and security
X_2 – errors in diagnosis and treatment
X_3 – ethical issues
X_4 – lack of personal contact
X_5 – bias and inequality
X_6 – unequal access
X_7 – dependence on technology
X_8 – legislative and regulatory challenges

Checking the matrix correctness based on the control sum determination:

$$\sum x_{ij} = \frac{(1+n)n}{2} = \frac{(1+8)8}{2} = 36 \quad (2)$$

The sums in the columns of the matrix are equal to each other and correspond to the checksum, so the matrix is correct.

The factors in terms of significance, according to the sum of ranks, are distributed as shown in Table 6.

Table 6. Factor Distribution by Significance

Factors	Sum of ranks
x_2	38
x_1	39
x_5	41.5
x_4	43.5
x_8	44
x_3	47
x_7	53
x_6	54

Source: Based on results of authors' survey

Thus, the risks were ranked by the significance degree of potential negative consequences as follows (from the most significant to the least significant):

X_6 – unequal access. The high costs of developing and implementing AI technologies may lead to unequal access to advanced healthcare services, widening the gap between different regions and socioeconomic groups.

X_7 – dependence on technology. Increased dependence on AI systems may lead to a decrease in the skills and competencies of healthcare experts, especially in situations where quick decisions are required without AI support.

X_3 – ethical issues. The AI use raises the issue of responsibility for medical decisions, in particular when AI provides recommendations that lead to negative consequences for the patient.

X_8 – legislative and regulatory challenges. The AI rapid development requires adaptation of existing legal and regulatory frameworks to ensure effective oversight and control over the AI use in medicine.

X_4 – lack of personal contact. Dependence on AI may reduce personal communication between doctor and patient, which is an important aspect of medical care.

X_5 – bias and inequality. The data on which AI algorithms are trained may contain biases that lead to unequal recommendations or diagnostic conclusions, especially among minority and underrepresented groups.

X_1 – data privacy and security. The large volumes of sensitive medical data processed by AI systems put patients' privacy at risk. Risks include unauthorised access, data leakage, and cyberattacks.

X_2 – errors in diagnosis and treatment. Improperly trained or inaccurate AI algorithms can lead to errors in disease diagnosis or treatment recommendations, potentially harming patients.

To assess the consistency of experts' opinions and the possibility of analysing the existence of the closest to objective grounds for drawing further conclusions based on the study, the average consistency degree of all experts' opinions was assessed. The coefficient of concordance was used for the case when we have related ranks (the same rank values in the assessments of one expert):

$$W = \frac{S}{\frac{1}{12} * m^2(n^3 - n) - m * \sum T_i} \quad (3)$$

Notes:
S = 249.5 (sum of squares of respective parameters rank deviations from the arithmetic mean of the rank sums)
n = 8 (number of factors under study)
m = 10 (number of experts)

$$T_i = \frac{1}{12} * \sum(t_l^3 - t_l) \quad (4)$$

Notes:
T_i – number of links (types of elements that are repeated) in assessments of the i expert
t_l – number of elements in the first link for the i expert (number of repeated elements)

$$T_1 = [(43 - 4) + (43 - 4)] / 12 = 10 \quad (5)$$

$$T_2 = [(43 - 4) + (23 - 2)] / 12 = 5.5 \quad (6)$$

$$T_3 = [(33 - 3) + (33 - 3)] / 12 = 4 \quad (7)$$

$$T_4 = [(33 - 3) + (43 - 4)] / 12 = 7 \quad (8)$$

$$T_5 = [(53 - 5) + (23 - 2)] / 12 = 10.5 \quad (9)$$

$$T_6 = [(33 - 3) + (53 - 5)] / 12 = 12 \quad (10)$$

$$T_7 = [(43 - 4) + (33 - 3)] / 12 = 7 \quad (11)$$

$$T_8 = [(33 - 3) + (23 - 2) + (33 - 3)] / 12 = 4.5 \quad (12)$$

$$T_9 = [(23 - 2) + (43 - 4) + (23 - 2)]/12 = 6 \quad (13)$$

$$T_{10} = [(23 - 2) + (43 - 4) + (23 - 2)] / 12 = 6 \quad (14)$$

$$\sum T_i = 10 + 5.5 + 4 + 7 + 10.5 + 12 + 7 + 4.5 + 6 + 6 = 72.5 \quad (15)$$

$$W = \frac{249{,}5}{\frac{1}{12} * 10^2(8^3 - 8) - 10 * 72.5} = 0.0718 \quad (16)$$

W = 0.0718 indicates that there is a weak consistency degree in the experts' opinions.

For further analysis of the results of collecting expert opinions, we used the method of average estimates. It involves calculating the arithmetic mean of all ratings received for each question. Consequently, we get a generalised picture of the answers. The calculated sum of ranks assigned to the statements is shown in Table 7.

Table 7. Sum of Statement Ranks

Statements / Experts	1	2	3	4	5	6	7	8
1	2	1	1	1	2	2	2	1
2	4	3	3	5	3	3	2	5
3	4	1	3	5	3	5	5	3
4	4	5	5	5	4	6	5	4
5	3	3	3	3	3	4	4	5
6	3	3	5	5	5	3	5	5
7	3	4	4	2	3	3	3	4
8	3	5	5	4	3	4	4	3
9	3	3	4	4	5	4	5	4
10	5	4	4	3	4	5	4	3
Total	34	32	37	37	35	39	39	37
Mean	3.4	3.2	3.7	3.7	3.5	3.9	3.9	3.7
x_6				54				

Source: Based on results of authors' survey

We divide the total amount by the number of experts. As a result, we calculate the arithmetic mean rank. Based on the average ranks, the final ranking (ordering) was constructed based on the principle that the lower the average rank, the better the statement (project). The results are presented in Table 8.

Table 8. Summary of Expert Ranks

Number of order places	Factor position by expert's assessment	New ranks
1	1	1
2	2	2
3	3	3
4	4	5
5	4	5
6	4	5
7	7	7.5
8	7	7.5
N	**Mean assessment**	**New rank**
1	3.4	2
2	3.2	1
3	3.7	4
4	3.7	4
5	3.5	3
6	3.9	7
7	3.9	7
8	3.7	4

Source: Based on results of authors' survey

Therefore, ordering by the sum of ranks (their arithmetic mean) is as follows:

2 < 1 < 5 < 3, 4, 8 < 6, 7. In this case, the entry "2 < 1" implies statement 2 precedes statement 1 (i.e., statement 2 is more relevant, more important than statement 1). Since some statements received the same amount of points, they are equivalent according to the chosen method, and subsequently grouped into the "equivalence class".

According to the analysis results based on the method of average expert estimates, statement X_2 on the risk of diagnostic errors is the most agreed upon among experts, followed by risk X_1. As to the expert group's assessment of indicators importance, these statements are the least risky in terms of undesirable consequences for AI in the medical field. That is, when developing a plan to deal with the risks of AI implementation in the healthcare sector, these risks can be considered last, as they are considered to pose the least potential danger by the experts. As shown in Table 13, closeness of the mean scores indicates a high level of consensus on certain issues.

The results obtained by the average estimate method should be used as a starting point for more in-depth analysis, including the median rank method, statistical tests for significant differences between groups and questions.

CONCLUSIONS

Artificial intelligence has a potential to become a reforming tool in the hands of medical professionals, offering new opportunities to improve the quality of healthcare, optimise treatment processes and increase efficiency of resource use in the medical sector. Ukraine has every chance to take advantage of the benefits offered by AI to improve the healthcare sector efficiency and boost the country's economic development. However, to achieve these goals, it is necessary to actively work on developing accessibility and awareness of direct users and on neutralising the main risks of implementation.

The survey provided valuable information on the attitude of healthcare experts towards the AI use in diagnostics. It identified potential opportunities and challenges that the medical community may face. The data analysis allows us to draw important conclusions about the development of diagnostic medicine and pave the way for further research and development in this area.

Increasing AI research funds, developing training programmes for medical professionals, and developing ethical principles for the AI use in medicine are direct actions to improve the AI efficiency in the diagnostic field and in the medical field in general. Another proactive mechanism is to calculate and neutralise potential risks that may be faced in implementation and execution of the AI programme in the work of healthcare professionals and the industry as a whole.

Despite the AI significant potential to improve medical diagnosis and treatment, there are risks and challenges that need to be taken into account when implementing it in medical practice. Based on the survey, we have identified the main risks and potential problems that may arise when implementing AI in the medical field (from the most important to the least important):

1. Unequal access;
2. Dependence on technology;
3. Ethical issues;
4. Legislative and regulatory challenges;
5. Lack of personal contact;
6. Prejudice and inequality;
7. Privacy and data security;
8. Errors in diagnosis and treatment.

Given these risks, it is important to develop comprehensive strategies to minimise them, including raising data security standards, ensuring transparency of AI systems, developing ethical principles for the AI use in medicine, and ensuring equal access to technology for all segments of the population. It is necessary to focus on the top priority areas of effort based on the risk principle, which poses a potentially greater threat in terms of economic efficiency and public health.

To minimise the risks associated with the AI use in medicine, a comprehensive strategy is needed, which should include the following elements in accordance with the ranking of risks.

Ensuring equal access to technology

1. Support for government initiatives: Developing and supporting government programmes aimed at ensuring equal access to medical innovations, including AI;

2. Training and educational programmes: Conducting training programmes for healthcare professionals to increase their competence in using AI and understanding its capabilities and limitations;

3. Financial support for medical institutions: Providing financial support to healthcare institutions, especially in resource-limited regions, implementing AI technologies.

Ensuring transparency of AI systems

1. Documentation of algorithms: Creating full documentation for AI algorithms that will allow to understand their operation and decision-making criteria;

2. Involvement of medical specialists: Involving doctors and other medical professionals in the process of AI development and adapting to ensure their compliance with medical standards.

Developing ethical principles for the AI use in medicine

1. Development of ethical codes: Establishing clear ethical principles for the AI use in medicine, including issues of confidentiality, non-discrimination, and responsibility;
2. Ethics committees: Establishing ethics committees to evaluate and monitor the AI use in healthcare settings.

Improving data security standards

1. Application of advanced encryption methods: Ensuring that medical data is protected by modern encryption methods during transmission and storage;
2. Regular security audits: Conducting regular security audits to identify and address potential vulnerabilities in AI systems;
3. Limited access to data: Providing limited access to patient data by allowing access only to authorised individuals.

Implementing this comprehensive strategy will require efforts from government agencies, the medical community, AI developers, and the public. It is important to ensure that AI benefits in medicine are accessible to all segments of the population, and that the risks are minimised and effectively managed. Since all above measures are quite material, time, and labour-intensive, it is relevant to prioritise tasks based on the relative importance of each action as to the negative consequences of the potential risk.

Author Contributions

Conceptualisation: N. S.; methodology: N. S.; software: N. S.; validation: N. S.; formal analysis: N. S.; investigation: N. S.; resources: N. S.; data curation: N. S.; writing – original draft preparation: N. S.; writing – review and editing: N. S.; visualisation: N. S.; supervision: N. S.; project administration: N. S.; funding acquisition: N. S.; leadership: N. S.

Conflict of Interest

The author declares no conflicts of interest.

Data Availability Statement

Not applicable.

Informed Consent Statement

Informed consent was obtained from all individual participants included in the study.

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Appendix A

Questionnaire on the use of artificial intelligence in diagnostics

Information about the respondent

1. Specialisation
– Radiology
– Neurology
– Cardiology
– Oncology
– Endocrinology
– Other (please specify)

2. Length of work experience:
– Up to 5 years
– 5-10 years
– 11-20 years
– More than 20 years

3. Your region of work:
– City
– Rural area

Experience in using artificial intelligence in diagnostics

4. Have you had any experience with AI-based diagnostic systems?
– Yes
– No
If yes, please describe briefly your experience.

5. In your opinion, which diseases/conditions are most appropriate to diagnose using AI?

Assessment of feasibility of using AI in diagnostics

6. To what extent do you think AI can improve diagnostic accuracy?
– Can significantly improve
– Can improve
– Can slightly improve
– Cannot improve

7. Do you think AI can be effective in reducing the workload of doctors?
– Yes
– No
– Not sure

8. What do you think are the main advantages of using AI in medical diagnostics?

9. What are the possible risks or disadvantages of using AI in diagnostics?

Barriers and challenges in implementing AI in diagnostics

10. What barriers, in your opinion, exist for the AI implementation in medical diagnostics in your practice?

11. Do you think that training and education of medical staff via the AI use is adequate?
– Yes
– No
If no, what areas need to be improved?

General questions

12. What recommendations would you make to improve the process of implementing and using AI in medical diagnostics?

13. Do you think that the future of medical diagnostics is associated with the use of artificial intelligence?
– Yes
– No
– Not sure

Please add any additional comments or observations that you think are important regarding the AI use in medical diagnostics.

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Appendix B

Questionnaire for assessing the risks associated with the use of artificial intelligence in medicine

This questionnaire is designed for experts in the field of medicine and artificial intelligence to assess the significance of risks associated with the AI use in medical practice. Your expert opinion is important for identifying and understanding the potential risks that may affect the further implementation of AI in the industry. Please rate each of the following risks on a 5-point scale where 1 means "Low risk" and 5 means "High risk". You will be presented with 8 risks of using AI in the medical field. On a 5-point scale, rate the importance of neutralising each risk according to the consequences it could have if it were to become a reality. You may repeat the assessment.

1. Data privacy and security
Large volumes of sensitive medical data processed by AI systems put patients' privacy at risk. Risks include unauthorised access, data leakage, and cyberattacks.

2. Errors in diagnosis and treatment
Improperly trained or insufficiently accurate AI algorithms can lead to errors in disease diagnosis or treatment recommendations, potentially harming patients.

3. Ethical issues
The AI use raises the question of responsibility for medical decisions, in particular when AI provides recommendations that lead to negative consequences for the patient.

4. Lack of personal contact
Dependence on AI may reduce personal communication between doctor and patient, which is an important aspect of medical care.

5. Bias and inequality
The data on which AI algorithms are trained may contain biases that lead to unequal recommendations or diagnostic conclusions, especially among minority and underrepresented groups.

6. Unequal access
The high costs of developing and implementing AI technologies can lead to unequal access to advanced healthcare services, widening the gap between different regions and socioeconomic groups.

7. Dependence on technology
Increased dependence on AI systems may lead to a decrease in the skills and competencies of healthcare professionals, especially in situations where quick decisions are required without AI support.

8. Legislative and regulatory challenges
The AI rapid development requires the adaptation of existing legislative and regulatory frameworks to ensure effective oversight and control over the AI use in medicine.