AI Potential to Tackle Healthcare Issues

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Abstract: Artificial intelligence (AI) has the potential to revolutionize public health by improving disease detection, prediction, treatment, and prevention efforts. However, there are also dissonances associated with the use of AI in public health that should be carefully considered. This review will explore some of these dissonances. The major concern is the potential for AI to exacerbate existing health disparities. For instance, if AI algorithms are trained on biased data sets, they may perpetuate or even amplify existing biases in healthcare delivery. This could lead to unequal access to healthcare services and poorer health outcomes for marginalized populations. Another concern is the ethical implications of using AI in healthcare decision-making. For example, if an AI algorithm is used to make a diagnosis or treatment recommendation, who is responsible if something goes wrong? How can patients be assured that their data is being used ethically and transparently? There are also concerns about the accuracy and reliability of AI algorithms in healthcare settings. While AI has shown promise in detecting diseases such as cancer from medical images with high accuracy, there have also been cases where AI algorithms have produced false positives or false negatives. This could lead to unnecessary treatments or missed diagnoses. Finally, there are concerns about the potential for AI to replace human healthcare workers. While AI can help to automate certain tasks and improve efficiency in healthcare delivery, it cannot replace the human touch that is often critical for patient care. Thus, policymakers and stakeholders should work together to ensure that these technologies are developed and deployed ethically and transparently so that they can truly benefit all members of society. While AI holds tremendous promise for improving public health outcomes, it is imperative to acknowledge and address the dissonances associated with its use. Ethical concerns, biases, privacy and security issues, workforce implications, and the digital divide are important areas of consideration. By proactively addressing these dissonances, we can ensure responsible and equitable integration of AI in public health, maximizing its potential benefits while minimizing potential risks. Further research, policy development, and collaboration among stakeholders are necessary to navigate these challenges successfully.

1 INTRODUCTION

Artificial intelligence (AI) in health is now a new hype, so it is not surprising that we are witnessing the well-established part and power of future visions being played out by a range of stakeholders in the area. Artificial intelligence technologies in medicine is one of the main trends in the healthcare world. AI and neural networks can fundamentally change the entire world of healthcare sector: transform the diagnostic system, promote the development of new drugs, improve the quality of medical services in general and reduce costs. For the brighter future, the capacities of AI are almost limitless. Computing scientists Feigenbaum Barr (Barr, Feigenbaum, Cohen, 1981) who called artificial intelligence a field of computer science aimed at creating intelligent systems that have the capabilities inherent in the human mind proposed one of the first definitions of AI back in the 1980s. These include the ability to learn, language recognition, the ability to reason and solve various problems. Today, AI is a mere software tool with a set of algorithms and methods to tackle intellectual problems in the same way as a person would do.

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Once Geoffrey Hinton, a Turing laureate and a prominent figure in deep learning, has expressed optimism about the potential of AI to revolutionize healthcare (LeCun, Bengio, Hinton, 2015). Hinton believes that AI can significantly enhance the accuracy and efficiency of medical diagnoses. By analyzing large amounts of data, including medical images, genetic information, and patient records, AI algorithms can identify patterns and anomalies that may not be easily detectable by human experts. This can lead to earlier and more accurate diagnoses, ultimately improving patient outcomes. Honorary Doctorate from the University of Edinburgh envisions AI playing a crucial role in the development of personalized medicine. AI algorithms may help identify individualized treatment plans and predict how patients will respond to specific therapies by leveraging patient data and genetic information. Other applications of AI are powerful tools in drug discovery. We can only imagine a vast amount of biological and chemical data AI algorithms 'digest" in a second to identify potential drug candidates, predict their efficacy, and accelerate the drug development process. Hinton believes that AI has the capability to transform healthcare by improving diagnostics, enabling personalized medicine, advancing drug discovery, and facilitating remote monitoring.

While acknowledging the challenges and ethical considerations, we are striving to remain optimistic about the positive impact AI can have in revolutionizing healthcare for the better, though, bringing an exemplified set of questions that fall into domain of AI use in public health for the good of society (Ecer, Pamucar, 2021; Pauch, Bera, 2022; Morgenstern, Rosella, Daley, Goel, Schünemann, Piggott, 2021; Santosh, Gaur, 2022; Morganstein, 2022). These questions represent a small sample of the many inquiries that arise when exploring the use of AI in public health for the betterment of society. They highlight the potential of AI to address public health challenges, improve healthcare outcomes, and promote equitable and evidence-based healthcare practices.

2 THE COVID-19 PANDEMIC TO BOOST INTEREST IN ARTIFICIAL INTELLIGENCE DEPLOYMENT

These were the COVID-19 pandemic and the advances of artificial intelligence (AI) in healthcare that have had significant global consequences (Bell, van Gemert, Merilles, Cash, Stoové, Hellard, 2022; Yuloskov, Bahrami, Mazzara, Kotorov, 2021). While we can only provide a general overview, it's important to note that modeling the precise consequences would require complex data analysis and forecasting techniques beyond the scope of this paper. However, we can highlight some key areas where the pandemic and AI in healthcare have intersected:

2.1 Disease Surveillance and Early Detection

AI has played a crucial role in monitoring and predicting the spread of COVID-19. Machine learning algorithms have been employed to analyze large datasets, including epidemiological data, mobility patterns, and social media content, to identify potential outbreak hotspots and predict disease transmission patterns (Kuzmenko, Lyeonov, Letunovska, Kashcha, Strielkowski, 2023). Moreover, AI-powered surveillance systems have been developed to detect COVID-19 cases from medical imaging such as chest X-rays and CT scans. These systems are assisting healthcare providers in early identification and triage of infected individuals, enabling prompt treatment and containment measures.

2.2 Diagnosis and Screening

AI has been utilized to develop diagnostic tools for COVID-19. Machine learning models are now being trained on diverse datasets to identify patterns in symptoms, laboratory test results, and medical imaging to aid in accurate and efficient diagnosis (Strielkowski, Zenchenko, Tarasova, Radyukova, 2022). Initial screening and classification for virus symptoms are supported by AI-enabled chatbots and virtual assistants. These systems help alleviate the burden on healthcare systems by providing guidance to individuals and directing them to appropriate care.

2.3 Drug Discovery and Development

AI has accelerated drug discovery efforts for COVID-19 by applying appropriate algorithms to analyze large databases of existing drugs, identifying potential candidates for repurposing and accelerating the discovery of novel antiviral compounds (Madhav, Tyagi, 2022).

2.4 Healthcare Resource Optimization

Much has been done to optimize healthcare resource allocation during the pandemic with AI algorithms. Predictive analytics and machine learning

models were most efficient in forecasting hospitalization rates, ICU bed occupancy, and ventilator demand, aiding in resource planning and allocation. Personal protective equipment (PPE) was optimally prioritized based on risk assessment and demand projections (Aerts, Bogdan-Martin, 2021; Fontes, Hohma, Corrigan, Lütge, 2022; Johnson, Wei, Weeraratne, Frisse, Misulis, Rhee, Snowdon, 2021; Vollmer, Mateen, Bohner, Király, Ghani, Jonsson, Cumbers, Jonas, McAllister, Myles, 2020).

AI algorithms have been employed for remote patient monitoring, analyzing data from wearable devices and IoT sensors to track COVID-19 symptoms, vital signs, and disease progression. This facilitates early intervention and timely medical advice.

The consequences of the COVID-19 pandemic and the advances of AI in healthcare are multifaceted and continue to evolve. Their long-term impact will depend on various factors, including the global response to the pandemic, technological advancements, ethical considerations, and regulatory frameworks. Ongoing research and analysis are necessary to fully understand the global consequences and potential benefits of these intersecting phenomena.

3 PLYING WITH AI IN HEALTHCARE: IS IT SAFE ENOUGH?

3.1 Data collection

With the development of AI technologies, medicine, like many other fields, is faced with the issue of violating privacy for the sake of efficiency. For AI to be effective, we need access to a large amount of patient data. This approaches health state, though, violates the rights to the protection of sensitive personal data. The use of AI in public health often involves collecting and analyzing sensitive personal health data. Maintaining privacy and safeguarding data security are paramount to protect individuals' rights and maintain public trust (Ghazal, Hasan, Alshurideh, Alzoubi, Ahmad, Akbar, Akour, 2021; van der Schaar, Alaa, Floto, Gimson, Scholtes, Wood, McKinney, Jarrett, Lio, Ercole2021; Ilan, 2021). Adequate data governance frameworks and robust cybersecurity measures should be in place to prevent unauthorized access and misuse of sensitive health information.

The fundamental principle of personal data protection is the concept of minimization, according to which data should not be collected, used or stored for longer than is necessary to achieve the purposes of their processing. Additionally, personal data should be initially notified of the purposes of processing the data. AI poses serious challenges for data minimization:

- data maximization is central to success in AI work;
- in the work of AI, it is not always known in advance which data will be useful for making a specific decision;
- data collected and processed in the past for a specific purpose may be extremely useful for the work of AI in the future, for this reason it is impossible to initially specify all the purposes of processing personal data.

The way the issue can be tackled is to depersonalize personal data. However, any depersonalized data is also personal data and cannot be simply collected from the information systems of medical organizations. In order to do this correctly and legally, we need to know the important nuances and properly document the process of collecting and processing such anonymized data. It will take decades to obtain consent to the processing of personal data from tens of thousands of patients. Therefore, in an ideal scenario, when developing and implementing any digital technology or new service, policy-makers require ‘seamless consent’ of patients, when the patient gives consent once to all possible further manipulations with personal data purposes.

3.2 Cybersecurity: is protection reliable and who is responsible for violations?

For cybercriminals, patient health data is of great value. Attackers can use such data for tax fraud, access to prescription drugs, selling a personal database to drug distributors, etc. Data from an electronic card can get to insurance companies that want to increase the price of a medical insurance (policy) if the patient does not comply all doctor's recommendations for treatment and does not lead a healthy lifestyle (Velmovitsky, Bevilacqua, Alencar, Cowan, Morita, 2021; Dwivedi, Hughes, Ismagilova, Aarts, Coombs, Crick, Williams, 2021; Rosemann, Zhang, 2022). The employer may refuse the applicant if he becomes aware of the candidate's chronic diseases or genetic predispositions to certain types of diseases. In some countries, information about deceased or seriously ill patients is often illegally transferred to funeral services agencies.

Gaps in the information security of AI systems are fraught not only with a violation of privacy, but also with direct threats to life and health. One of the

most popular examples of such crimes is the remote hacking of a pacemaker and the deliberate 'retraining' of a diagnostic and recommender system. As a result, the system may offer a deadly drug or procedure to the patient. In a critical case, this can lead to massacres. Therefore, wearable devices should be securely protected from external attacks.

3.3 Opaque decision-making algorithm and responsibility

The performance of AI has been driving rapid change in healthcare. However, the results obtained using such technologies are often difficult to interpret due to the ability of AI systems to self-learning. These algorithms are called AI 'black box' as human minds are not always capable to interpret the results. The main problem with this principle of AI is that, when issuing results, the system cannot comprehensively demonstrate how and on what grounds it made a particular decision. However, the way the AI came to a particular conclusion is important information for drawing up a treatment plan. So, if this is not understood, a distrustful attitude towards machine logic and its achievements will remain (Secinaro, Calandra, Secinaro, Muthurangu, Biancone, 2021; Verdejo Espinosa, López, Mata Mata, Estevez, 2021).

According to a study by the American analytical company FICO, two-thirds of development companies cannot explain how an AI system makes a decision, and only one out of five companies pays attention to this and other ethical issues when making decisions.

To earn the trust of consumers and avoid problems with regulators, organizations should think about the introduction of explainable artificial intelligence (XAI) in the future (National Institute of Standards and Technology (NIST) published in August 2020 the first draft of the list principles of explainable artificial intelligence).

An attempt to earn the trust of consumers was made by IBM by developing a 'revolutionary' supercomputer with artificial intelligence Watson, capable of perceiving, understanding and making decisions based on natural language. As planned by the developers, Watson is designed to help diagnose cancer and develop treatment plans for patients. However, internal IBM documents show that the Watson supercomputer frequently makes erroneous recommendations for cancer treatment. The company's medical professionals and customers have identified many examples of unsafe and incorrect treatment recommendations. IBM later announced bug fixes and software improvements.

The black box problem also makes it difficult to determine the terms of accountability for AI errors. Who should be held responsible for misdiagnosing or prescribing inappropriate treatment (based on an erroneous AI decision) - the developer, the doctor, the medical organization, or someone else? So far, courts around the world have not formulated a clear approach to determining the liability associated with the creation of automated information systems. This approach will largely depend on the standards set by the professional community.

3.4 Diagnostic error

Scientists (Fosch-Villaronga, Drukarch, Khanna, Verhoef, Custers, 2022) warn that using AI-assisted image reconstruction and analysis to make a diagnosis and determine treatment could harm patients According to Rivera et al. (Rivera, Liu, Hughes, Dunster, Manna, Denniston, Calvert, 2023), even small errors 'at the input' can lead to fundamentally different diagnoses at the output. Nevertheless, the gradual increase in the number of cases of successful application of AI in diagnostics strengthens the credibility of new developments.

The human body is individual; therefore, surely enough artificial intelligence will not be able to work 100% error-free. Its job is to help doctors. It is no coincidence that the term 'clinical decision support system' (CDSS) has recently become widely used. This emphasizes that artificial intelligence is an assistant to the doctor, and not a replacement. The final decision should always be made by the individual.

3.5 AI bias

Even though machine learning systems look for patterns in data, they don't always find the right patterns. 'Prejudices' can get into the algorithms due to an oversight of the developers or due to the lack or incompleteness of the data used (Kopalle, Gangwar, Kaplan, Ramachandran, Reinartz, Rindfleisch, 2022; Gehl Sampath, 2021).

For example, dermatologists often photograph a ruler along with skin cancer manifestations to record the size of the lesions. There are no rulers on the examples of photos of healthy skin. For the AI system, such rulers (more precisely, the pixels that we define as a 'ruler') have become one of the differences between sets of examples, and sometimes more important than a small rash on the skin. So a system designed to recognize skin cancer sometimes recognized rulers instead.

The increased attention to the problem of artificial intelligence bias is also due to the fact that often the results of the application of AI technologies affect key values of society, such as racial and gender equality. Machine learning systems in healthcare can be subject to algorithmic bias - there have been cases

where they predicted a greater likelihood of disease based on data regarding the gender and race of the patient, which are not actually causal factors.

The health risk prediction algorithm has been shown to be racially biased (Agarwal, Bjarnadottir, Rhue, Dugas, Crowley, Clark, Gao, 2023; O'Connor, Booth, 2022). The algorithm was designed to predict which patients were most likely to need additional medical care, but then it turned out that the algorithm produced erroneous results that favored white patients over black patients.

At the moment, there is no official regulatory guidance on the use of training data. To deal with bias issues, researchers and experts are advocating for a framework for transparency and the development of reporting standards, including the publication of the source code of artificial intelligence models.

4 POLITICAL AND INSTITUTIONAL LIMITATIONS TO REGULATE THE USE OF ARTIFICIAL INTELLIGENCE IN PUBLIC HEALTH

The integration of artificial intelligence (AI) into public health presents unique regulatory challenges due to its complex nature and potential impact on individuals and communities. This review aims to examine the political and institutional shortcomings that impede the effective regulation of AI in public health, with a focus on global perspectives.

Regulatory frameworks for AI in public health vary significantly across countries, leading to inconsistencies and challenges in ensuring responsible and ethical use. Fragmentation arises due to differences in legal systems, policy priorities, and cultural contexts. Harmonizing regulations and standards at the international level is crucial to address the global nature of AI in public health and to prevent potential regulatory arbitrage.

One may be concerned with a slow policy adaptation. The rapid pace of technological advancements often outpaces the development of regulatory policies. Governments and institutions struggle to keep up with the dynamic AI landscape, resulting in delays in policy formulation and updates. This lag in policy adaptation creates legal and ethical gaps, leaving public health systems vulnerable to potential risks and harms associated with AI.

The global nature of AI in public health necessitates international collaboration and coordination. However, there is a lack of cohesive efforts and standardized approaches among nations to address the regulatory challenges. Limited international coordination hampers the sharing of best practices, data, and resources, and impedes the development of comprehensive global frameworks.

The major challenge is the lack of international standards and regulations for the development and deployment of AI in healthcare settings. While some countries have developed their own guidelines for the ethical use of AI in healthcare, there is no global consensus on best practices. This can lead to a lack of accountability and transparency in the development and deployment of AI technologies.

The laws of the countries (see Table 1, adapted from ref. 31-34) worldwide are not adapted to the specifics of systems using AI. The law performs a restrictive function, it is conservative, and this greatly slows down the development and implementation of AI-based systems in clinical practice. Special regulation may increase the speed and intensity of research and development and become the basis for a significant breakthrough in the development of artificial intelligence.

Table 1: The USA and Europe regulatory framework in AI use.

APRIL 2018 EU Declaration on Cooperation in the field of AI	**FEBRUARY 2020 EU White Paper on AI**	**APRIL 2021 Law of the European Commission on artificial intelligence**
25 European countries signed the Declaration of Cooperation in the field of AI and agreed to work together on the most important issues posed by the development of artificial intelligence, from ensuring Europe's competitiveness in the field of research and	The White Paper defines an action plan for the development and regulation of AI via: - innovation and scientific centers in the field of AI and development of their strategic provisions; -promoting the introduction of AI in the public sector;	The European Commission's comprehensive bill on artificial intelligence defines four levels of AI risk: unacceptable risk, high risk, limited risk, and minimal risk. Healthcare AI applications

application of AI to working with social, economic, ethical and legal issues.	-creating ethical principles, and developing recommendations for AI.	are generally categorized as high-risk and should meet certain criteria in order to receive regulatory approval.
MAY 2017 The Medical Device Regulation EU201/745	**APRIL 2016 General Data Protection Regulation (EU) 2016/679**	**FEBRUARY 2019 Executive Order 13859 "Maintaining American Leadership in Artificial Intelligence" 02/11/2019**
The document classifies medical equipment into the following risk classes: class I (low risk), class IIa and class IIb (medium risk), class III (high risk).	Describes the rules for working with personal data in the European Union. States that a software device must inform the user about cases when he/she is dealing with an automated decision-making system, as well as provide information about the logic of this system and the expected consequences of such processing for user.	The document covers all areas of work, including R&D in the field of key technologies; development and testing of prototype systems with AI; practical application and refinement of AI technologies; creation of the necessary infrastructure, data sets, technical and ethical standards for the creation and application of AI.
NOVEMBER 2020 Guidance for Regulation of Artificial Intelligence Applications	**Regular updates on the website FDA Guidances with Digital Health Content**	**JANUARY 2021 Artificial Intelligence / Machine Learning (AI/ML)-Based Software as a Medical Device (SaMD) Action Plan**
The paper outlines the principles to be considered when developing approaches to the regulation of applications built using AI technologies: public trust in AI; involving the public in the rule-making procedures and raising its awareness; academic integrity and data quality; risk assessment and management; benefits and costs; flexibility; safety; interdepartmental coordination.	The Guidances with Digital Health Content section contains regulations and recommendations related to US digital health, which presents the position of the regulator in relation to AI-based solutions, the approach to their classification and registration.	The FDA highlights priority areas for further work, including the development of the regulatory framework; support for the development of advanced machine learning methods; as well as a customer-centric approach.

Registration and subsequent control of AI systems require the creation of a regulatory framework and technical regulation. The need for regulation in healthcare is primarily due to the risk of negative consequences of using AI systems with non-guaranteed quality in clinical practice. The creation of

unified regulatory and technical standards will minimize the risk of making erroneous decisions, solve the problem of the 'black box', regulate the collection and storage of personal data and thereby increase the level of user confidence in such systems.

Several countries worldwide have recognized the importance of establishing standards and regulations for the deployment of artificial intelligence (AI) in public health. While the specific regulations and frameworks may vary, the following countries have made notable efforts in this regard: The United States has taken significant steps in regulating AI in healthcare. The Food and Drug Administration (FDA) provides guidance on the development and use of AI-based medical devices. Additionally, organizations such as the National Institutes of Health (NIH) and the Centers for Disease Control and Prevention (CDC) contribute to the development of AI guidelines and initiatives in public health. The EU has been at the forefront of AI regulation and governance. The General Data Protection Regulation (GDPR) provides a comprehensive framework for data protection and privacy, which is relevant to AI applications in public health. It is important to note that the field of AI in public health is rapidly evolving, and regulations may vary across countries. Additionally, other countries not mentioned here may also have implemented standards and regulations specific to the use of AI in public health.

4.1 Ethical aspects of the AI use

Experts from the Nuffield Bioethics Council (UK) studied the use of AI in healthcare and identified the main ethical issues associated with the use of AI, such as risk of making wrong decisions; the responsibility when using AI for decision support; difficulties in checking the results of AI work; bias in the data that is used to train the AI; ensuring the security and confidentiality of data; ensuring public confidence in AI-based technologies; impact on the sense of dignity of people in conditions of social exclusion of people with limited mobility; impact on qualification requirements for medical workers; the potential for AI to be used for malicious purposes. In recent years, there has been an increased interest in the discussion of these issue in the scientific and business community. A number of documents, guidelines and codes have been drafted, and they are underway for introduction.

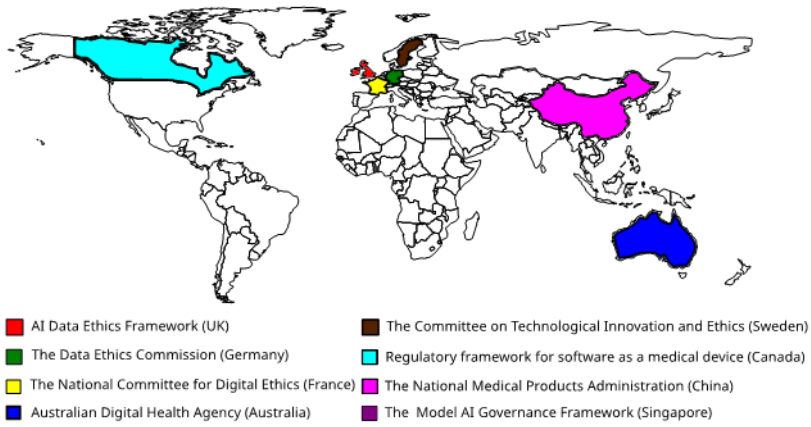

Figure 1. World map with countries and authorities that ratified Ethical Codes for AI use in Public Health (ref.35-38).

Russia's context

The role of digital ethics in digital transformation is explored by experts from the Center for Training Leaders and Digital Transformation Teams in analytical reports of the Ethics and Digital series. The authors describe the main problems and risks of digital technologies and offer possible solutions to ethical dilemmas. The framework developed by the Center for evaluating the ethics of digital decisions deserves special attention. This is a working tool that allows to identify risks and growth areas for an information system or other digital solution in terms of ethics and customer centricity.

The first Russian document describing the key principles of ethics in the development and implementation of artificial intelligence systems was adopted on October 26, 2021. The authors of the Code of Ethics for Artificial Intelligence were the AI Alliance and the Analytical Center under the Government of the Russian Federation and the Ministry of Economic Development. The document is advisory in nature. It serves as a benchmark for the

development of AI technologies in the country and is designed to ensure the trust in AI from users, society and the state.

International Documents

On April 8, 2019, the European Commission presented a list of key requirements for AI systems and the concept of reliable AI. Credible AI should first and foremost be legal (compliance with all applicable laws and regulations), ethical (observance of ethical principles and values), and trustworthy (both technically and in terms of the social environment in which it will apply for). Figure 3 shows the key requirements for AI systems, described in the document:

On June 26, 2019, the European Commission published a paper prepared by the High-Level Expert Group on AI (AI HLEG). The report incorporates recommendations that cover all aspects of regulating, financing, promoting the development and application of AI technologies in the EU. The recommendations call on governments to encourage the development and deployment of 'robust' AI systems, i.e. those that operate under human control, are applied in accordance with the rule of law, and are technically secure. The Recommendations also affirm the need to abandon the use of AI technologies for mass tracking and predicting people's behavior, state supervision of citizens.

Draft Recommendation on the Ethical Aspects of Artificial Intelligence, UNESCO. In 2021, UNESCO adopted a Draft Recommendation on the ethical aspects of AI. The recommendations are a framework normative document that regulates the scope of AI technologies and the possible social consequences of their application. UNESCO encourages Member States to voluntarily apply the provisions of the Recommendation. Figure 4 shows the declared principles drafted in the document.

The proposed documents and drafts are admitting the potential benefit AI might bring into human well-being and betterment of the society (Chauhan, Parida, Dhir, 2022; Manyazewal, Woldeamanuel, Blumberg, Fekadu, Marconi, 2021). Though, governments, professionals working in public and private research organizations, as well as philosophers, doctors, lawyers and other experts are urging health organizations to wield with the technology carefully and responsibly, when planning, implementing and evaluating the patient data.

Figure 2: Underlying principles of the Russian Ethical Code in AI.

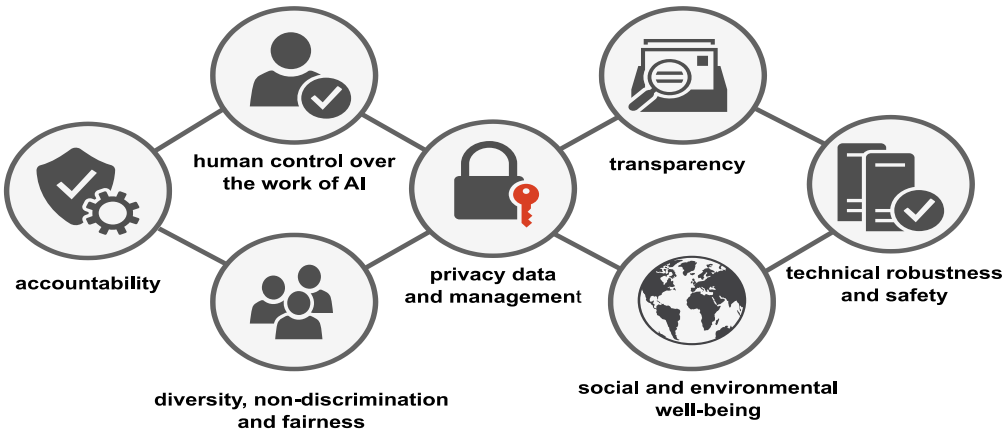

Figure 3: Key requirements for AI systems used in healthcare.

Figure 4: Ethical Aspects of Artificial Intelligence, UNESCO.

5 CONCLUSION

The interference of artificial intelligence in public health has the potential to offer numerous perspectives and opportunities. AI can aid in disease prevention by analyzing large volumes of health data to identify patterns, risk factors, and early signs of diseases. It can help predict outbreaks, monitor public health trends, and provide proactive interventions to prevent the spread of diseases. Machine learning algorithms can analyze medical images, such as X-rays or MRI scans, to detect abnormalities and assist in providing accurate diagnoses. AI can also support personalized treatment plans by analyzing patient data, medical records, and scientific literature to suggest optimal treatments and therapies. It has done a lot in Public Health Management by analyzing data

from various sources, including social media, wearable devices, and electronic health records. It is efficient in identifying health risks, tracking disease outbreaks, monitoring population health trends, and optimizing resource allocation for healthcare delivery.

AI accelerates the drug discovery process by analyzing vast amounts of genomic data, molecular structures, and scientific literature. Machine learning models predict drug-target interactions, identify potential drug candidates, and optimizing drug formulations, leading to more efficient and targeted drug development processes. AI-enabled technologies, such as virtual assistants and chatbots (King, 2023), enhance telemedicine services and provide remote healthcare support, symptom assessment, and patient education. Algorithms can analyze patient-generated health data, enabling remote monitoring and personalized care management for chronic diseases.

While AI holds tremendous potential for public health, it is important to acknowledge the limitations and challenges. Integration of AI into healthcare systems requires careful validation, regulatory oversight, and collaboration between AI developers, healthcare providers, policymakers, and ethical experts. Overall, the interference of AI in public health has the potential to transform healthcare delivery, enhance disease prevention and management, and improve population health outcomes. However, it is vital to approach AI implementation with responsible practices to ensure the ethical, equitable, and beneficial use of AI technologies for public health purposes. Privacy, security, and data protection are critical when dealing with sensitive health information. Ensuring transparency, fairness, and accountability in AI algorithms is essential to maintain trust in AI-based healthcare systems.

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