

Human right to virtual reality in the healthcare: legal issues and enforcement problems

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Abstract

A key feature of modern legal relations in the healthcare sector is the widespread use of digital technologies. This study describes certain aspects of the legal regulation of the human right to virtual reality in the healthcare sector and the problems of law enforcement. The methodology of this work is based on an interdisciplinary approach using comparative legal, dialectical and systemic methods. The main objective of this article is to determine the forms and directions of the use of virtual reality in health care in the context of human rights. It is emphasized that the introduction of smart technologies, virtual reality in the healthcare sector is the main modern trend in the development of healthcare in order to improve the provision of healthcare services. The human right to use virtual reality in healthcare is to ensure the actions of virtual reality users within the framework of virtual information relations in the healthcare sector, which are governed by the relevant legal norms. The human right to use virtual reality in healthcare is a fourth generation of human rights. These rights include all rights that have arisen as a result of scientific progress, the development of morality, namely "somatic rights", as well as information rights. The use of virtual reality in the healthcare sector is possible in the following areas, namely: (1) medical training, (2) surgical modeling, (3) rehabilitation, (4) psychotherapy and psychology, (5) ophthalmology, (6) telemedicine, etc. It is stated that user safety, privacy, freedom of expression, ethics and copyright protection in the use of virtual reality in healthcare require legislative regulation, taking into account the European experience. The virtual space in the healthcare sector provides opportunities for the realization of human rights and freedoms regarding the preservation of their health, but can be used to carry out actions that contradict the norms of law and have illegal behavior. The latter requires an improvement in the regulatory framework when using the virtual space of the healthcare sector to protect the interests of the individual, society and the state using international standards.

Keywords: human rights, health sector, virtual reality, legal regulation.

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1. Introduction

The development of health care and medical technologies is an important area of activity of the system of international organizations, including all agencies of the UN system, and above all their efforts to implement the Millennium Development Goals⁶. Global problems associated with the aging of the world's population, migration processes, a significant increase in the cost of medical services, the emergence of pandemics such as COVID-19 require the development of healthcare in close integration with digital technologies. The Covid-19 pandemic has triggered changes regarding the increasing role of online medical services, artificial intelligence, the development of virtual space and other modern digital technologies. The introduction of smart technologies, virtual and augmented reality in the healthcare sector is the main trend in healthcare development for 2020-2030, both in Ukraine and in the world. In the field of health care in Ukraine, "E-Zdorovya" and "e-Health" were launched, as well as "Helsi" through the massive computerization of public health institutions, establishing the possibility of making an appointment with a doctor online for a certain time, digitizing patients' personal data, introducing electronic patient histories, electronic prescriptions.

The development of virtual space, defined by Western scientists as "cyberspace" is becoming a problem for almost all spheres of functioning of both national and global legal systems and social and communicative structures. This is confirmed by the development of such areas as the creation of network, global, virtual, informational opportunities for e-communications, the functioning of e-business, the formation of international legal registries, legal associations, clusters, allowing to meet the information needs of society in the virtual space⁷, including in the field of healthcare. Virtual reality in healthcare has gained exceptional popularity in recent decades, especially after the advent of computer simulation methods. So, in the report "Research and Markets" it is said that augmented and virtual reality in the healthcare market reached \$ 769.2 million in 2017. Experts predict that this figure will rise to \$ 4997.9 million by 2023. According to Goldman Sachs Global Investment research, VR - AR applications in healthcare will become the second largest market after video games in 2025⁸. Virtual reality today is blurring the line between familiar reality and its digital embodiment, radically changing both different spheres of society, including the healthcare sector, as well as traditional

⁶ *Increasing the availability of medical technologies and innovations. At the intersection of healthcare, intellectual property and trade* (2013). World Health Organization, World Intellectual Property Organization and World Trade Organization. Available at: https://www.wipo.int/edocs/pubdocs/ru/wipo_pub_628.pdf [Accessed 18 Jan. 2021].

⁷ Zaslavska, O. O. *Visualization of political communication space: peculiarities and tendencies*. Scientific and Theoretical Almanac Grani, 2016., 19(8), 90-99. <https://doi.org/10.15421/171657>.

⁸ *What Does It Take to Develop a VR Solution in Healthcare*. Available at: <https://www.mddionline.com/augmentedvirtual-reality/what-does-it-take-develop-vr-solution-healthcare> [Accessed 18 Jan. 2021].

forms of human interaction⁹. Virtual reality offers real solutions to many health care delivery challenges¹⁰. So, the problem of legal regulation of the use of virtual reality in the health sector in the context of human rights is now relevant, which is associated with the decisive role of the processes of informatization, globalization and virtualization of health care and the protection of personal data and medical information.

2. Material and methods

In this work, a system of general scientific and special methods was used. Methods of abstraction, concretization and generalization of theoretical positions in scientific sources were used to determine the current state of the problem of legal regulation of the use of virtual reality in the healthcare sector. Also a method of terminological analysis for defining basic concepts in the study of the implementation of the human right to virtual reality in the health sector. With the help of the typology method, the existing forms and directions of using virtual reality in the healthcare sector are identified. Also, the study involved the methods of legal analysis, comparison, systemic and analytical methods.

3. Virtual reality in the healthcare sector as an object of legal regulation

The problem of information technology regulation appeared in the early 90-s. XX century, primarily in connection with the rapid development of access to the Internet and the beginning of a systematic scientific study of "virtual relations" among foreign scientists in the field of health care. So, Kuhlen, T., Dohle, C. revealed the perspectives of virtual reality for people with disabilities¹¹. Khan, R., et. al. point out that training with virtual reality simulators has an advantage over lack of training and can complement routine endoscopy training among surgical trainees¹². Samadbeik, M., et. al. studied the features of virtual reality as a new method of teaching various medical groups¹³. Gerup, J., et. al. drew attention to the peculiarities of the implementation of augmented reality and mixed reality for

⁹ Mamychyev, A., Dremluiga, R. *Crimes in VR*. Revista Dilemas Contemporáneos: Educación, Política y Valores, 2019, 1(129), 1-14.

¹⁰ Kovtun K. *Using VR and AR to manage businesses in the medical field*. 2020. 3(37). 100-109. Available at: <http://journal.bsau.ru/upload/iblock/924/9244765c276f8ad0433f6b9cb34e0c0d.pdf> [Accessed 18 Jan. 2021].

¹¹ Kuhlen, T., Dohle, C. *Virtual reality for physically disabled people*. Computers in Biology and Medicine, 1995, 25, 2, 205-211. [https://doi.org/10.1016/0010-4825\(94\)00039-S](https://doi.org/10.1016/0010-4825(94)00039-S).

¹² Khan, R., Plahouras, J., Johnston, B. C., Scaffidi, M. A., Grover, S. C., & Walsh, C. M. *Virtual reality simulation training in endoscopy: a Cochrane review and meta-analysis*. Endoscopy, 2019. 51(7), 653-664. <https://doi.org/10.1055/a-0894-4400>.

¹³ Samadbeik, M., Yaaghobi, D., Bastani, P., Abhari, S., Rezaee, R., & Garavand, A. *The Applications of Virtual Reality Technology in Medical Groups Teaching*. Journal of advances in medical education & professionalism, 2018. 6(3), 123-129.

medical education beyond surgery¹⁴, Tang, K. S., et. al. explored augmented reality in medical education¹⁵. Other authors have also pointed to the possibility of using virtual reality to combat autism Bellani, M., et. al.¹⁶, Holden M. K.¹⁷; Yuan S., & Ip. H.¹⁸, Park J.-M. & Noh G.-Y. in psychotherapy of phobias¹⁹. Pottle J. points out that the future of virtual reality lies in its ongoing integration into medical curricula and technological developments that enable the sharing of simulated clinical experiences. It will foster quality interprofessional education in the medical field, regardless of geography, and will transform education for the clinician of the future²⁰. Also, the virtual space is an object of research on a legal nature, researchers study its individual aspects from the point of view of combating offenses, information security, and copyright protection.

The rapid development of a new reality in the form of a digital economy, digital technologies in the healthcare sector creates a request for the formation of complex branches of law based on special legal regimes and principles. This, according to some experts²¹, characterizes the current state of the legal system, determines its perspective and preserves the fundamental nature of legal science. It should be noted that scientific approaches at the present stage of development of virtual reality in the health sector have both common and distinctive features, however, they do not make sense of this problematic in a systematic way, and do not disclose the forms of development of virtualization of health care in the context of human rights.

In the legal literature, there is also no unequivocal opinion about the place of virtual reality in the system of branches of law. A branch of law is an interconnection of homogeneous legal norms, isolated within the system of law. They affect a specific sphere of social relations and represent a set of legal norms distributed over legal institutions that regulate a special, qualitatively unique area of relations. Signs of the branch of law are: (1) a special subject and method of legal regulation, (2) its own regime of legal regulation; (3) impossibility to regulate the

¹⁴ Gerup, J., Soerensen, C. B., & Dieckmann, P. *Augmented reality and mixed reality for healthcare education beyond surgery: an integrative review*. International journal of medical education, 2020. 11, 1-18. <https://doi.org/10.5116/ijme.5e01.eb1a>.

¹⁵ Tang, K. S., Cheng, D. L., Mi, E., & Greenberg, P. B. *Augmented reality in medical education: a systematic review*. Canadian medical education journal, 2020. 11(1), e81–e96. <https://doi.org/10.36834/cmej.61705>.

¹⁶ Bellani, M., Fornasari, L., Chittaro, L., & Brambilla, P. *Virtual reality in autism: state of the art*. Epidemiology and psychiatric sciences, 2011 20(3), 235-238. <https://doi.org/10.1017/s2045796011000448>.

¹⁷ Holden M. K. *Virtual environments for motor rehabilitation: review*. Cyberpsychology behave., 2005. 8(3), 187-219. <https://doi.org/10.1089/cpb.2005.8.187>.

¹⁸ Yuan S., & Ip H. *Using virtual reality to train emotional and social skills in children with autism spectrum disorder*. London Journal of Primary Care. 2018. 10 (4). pp. 110-112.

¹⁹ Park J.-M., & Noh G.-Y. *The effects of vr simulation game on driving fear and efficacy*. JP Journal of Heat and Mass Transfer. 2018. 15 (Spec. Is. 2). pp. 161-169.

²⁰ Pottle J. *Virtual reality and the transformation of medical education*. Future healthcare journal, 2019.6(3), 181-185. <https://doi.org/10.7861/fhj.2019-0036>.

²¹ Kovalenko A.Yu. *Legal grounds for the formation of complex branches of law*. History of State and Law. 2015. 22. 44-46.

sphere of social relations by other branches of the legal system; (4) separate, usually codified legislation²². Most scholars believe that virtual law consists of legal norms that are part of several branches of law, namely: (1) international; (2) constitutional, (3) administrative, (4) civil, (5) criminal, (6) informational and some others. From our point of view, virtual reality in the healthcare sector should be considered as a complex legal institution which has its own subject and method of legal regulation, a special object and subject and its own legal regulation regime.

In the legal doctrine, there is no single point of view of understanding such a category as "cyberspace", "Internet" and "virtual reality" from a legal point of view. There is also no consensus among scientists on the definition of "virtual reality in healthcare" and the term "human right to virtual reality in healthcare". In science, the definition of "virtuality" is enshrined in the British Encyclopedia. Virtual reality is defined as the use of computer modeling and simulation that allows a person to interact with an artificial three-dimensional (3D) visual or other sensory environment. Virtual reality technologies immerse the user in a computer environment that simulates reality through the use of interactive devices, send and receive information and wear them in the form of glasses, headsets, gloves or suits²³. Some researchers point out that "virtual reality" is a set of technologies that can be used to create an artificial world that does not physically exist, but which is felt by the senses in real time in accordance with the laws of physics. Virtual objects and subjects created by technical means affect a person through his sensations: smell, sense of balance and position in space, touch, sight, taste, hearing²⁴. Other scientists note that virtual reality, which does not provide physical contact of a person, creates in a person a "feeling" of real action in the outside world, which is in conflict with legal doctrines that, as a rule, distinguish between physical contact and physical danger and objects that are "simple" audiovisual images, the result of digital communication²⁵. So, virtual reality in the health sector should be considered as a realistic imitation of the environment, including three-dimensional graphics, with the help of computer means with which a person can interact interactively, send and receive information using a helmet, glasses, headset, gloves or suits.

The Law of Ukraine "On the Basic Principles of Cybersecurity in Ukraine" defines the term "cyberspace". Cyberspace is an environment (virtual space) that provides opportunities for communication and (or implementation of public relations), formed as a result of the functioning of joint (united) communication systems and the provision of electronic communications using the Internet and/or

²² N.I. Matuzov, A.V. Malko, *Theory of state and law: textbook*, Moscow., Lawyer, 2004, 512 p.

²³ Lowood, H. E. *Virtual reality*. *Encyclopedia Britannica*. Available at: <https://www.britannica.com/technology/virtual-reality> [Accessed 18 Jan. 2021].

²⁴ Kuznetsov V.A., Russu Yu.G., Kupriyanovskiy V.P. *On the use of virtual and augmented reality*. *International Journal of Open Information Technologies*. 2019. 7. (4). p. 75.

²⁵ Lemley, M A. Volokh, E. *Law, Virtual Reality, and Augmented Reality*. *University of Pennsylvania Law Review*, 2018. 166, p. 5. Available at: <https://ssrn.com/abstract =2933867>[Accessed 18 Jan. 2021].

other global data transmission networks²⁶. About the concept of "Internet". According to Art. 1 of the Law of Ukraine "On Telecommunications" the concept of "Internet" is a global information system of public access, which is logically connected by the global address space and is based on the Internet protocol defined by international standards²⁷. Moreover, Lessig L. indicates that cyberspace is a technical construct based on a set of rules and regulations that determine the format of cyberspace regulation²⁸. Thus, the virtual space is considered as a special information space where computer programs operate and data moves.

Currently, international legal acts governing legal relations in cyberspace are in force, for example, the Council of Europe Convention on Cybercrime (2001), the UN General Assembly resolution "Achievements in the field of information and telecommunications in the context of international security" (2005), Geneva Declaration of Principles "Building the Information Society: A Global Challenge in the New Millennium" (2003), Okinawa Charter for the Global Information Society (2000), Declaration on Free Exchange on the Internet (2003), International Telecommunication Union Convention (1992), Convention on Crime in the field of computer information (2001), etc.

A key feature of modern legal relations in the healthcare sector is the widespread use of digital technologies. Modern digital technologies form not only a new "digital" reality, but also a new way of production, which, according to a number of scientists²⁹, forms the preconditions for the development of digitalization of public relations in the healthcare sector and the emergence of the law itself that regulates these relations. Thus, I.L. Bachilo points to virtual connections on the Internet and virtual relationships³⁰. Also distinguish in the literature the category of "virtual information legal relations". This legal structure is understood as: mutual relations of two or more persons regarding property benefits generated by the circumstances of the emergence and existence in the information technology space, as a result of communication and exchange of data in digital form, which are determined by supranational characteristics based on legal equality and autonomy the will of their subjects³¹. And other scientists have drew on virtualization of healthcare. So, Kovtun K. studied the use of VR and AR in medicine³². Volynets I. examined the problematic issues of countering cybercrime as a component of a potential threat in

²⁶ About the main ambush of the cybersecurity of Ukraine: the Law of Ukraine dated 05.10.2017. Available at: <https://zakon.rada.gov.ua/laws/show/2163-19#Text> [Accessed 18 Jan. 2021].

²⁷ On telecommunications: Law of Ukraine of 18.11.2003 № 1280-IV. Information of the Verkhovna Rada of Ukraine. 2004. № 12. Art.155, <https://zakon.rada.gov.ua/laws/show/1280-15#Text> [Accessed 18 Jan. 2021].

²⁸ Lessig L., *Code and Other Laws of Cyberspace*. New York. Basic Books. 1999, 203 p.

²⁹ Khabrieva T.Ya., Chernogor N.N. *Law in the context of digital reality*. Journal of Russian Law. 2018.1.85-102.

³⁰ Bachilo I.L. *Information law. Role and place in the legal system of the Russian Federation*. State and law. 2001.2.5-14.

³¹ Belyakov K.I. *Conceptual and methodological bases of regulation of new types of information relations: "virtual legal relations"*. Lex Portus 2016. 2. 47-63.

³² Kovtun K. *Using VR and AR to manage businesses in the medical field*. 2020. 3(37). 100-109. DOI:10.31563/2308-9644-2020-37-3-100-109.

the health sector. The author also outlines the causes and consequences of the impact of cyber attacks in the health sector³³. Nesynova, S.V., & Kniazieva, Yu.S analyzed theories of the human rights generation. The authors singled out the right to use virtual reality among the list of rights of the fourth generation of a person³⁴. The human right to use virtual reality is also highlighted by other authors Krylova D.³⁵, Shebanitz D.M.³⁶, Avramova O. & Zhidkova O.³⁷ etc.

There is no single list of rights related to the fourth generation of human rights in scientific sources. "The term" personal (somatic) rights" owes its appearance to the legal science of V. Kruss, who noted that a group of such rights can be distinguished in which there is a person's right to independently dispose of his body: to carry out its "modernization", "restoration" and even "fundamental reconstruction", change the functional capabilities of the body and expand them with technical-aggregate or medication³⁸.

The human right to virtual reality in healthcare is defined in the literature as "the right to use virtual information"³⁹; "the right to physical freedom"; or the right to "use virtual reality"⁴⁰; or "the right to virtual life". Other researchers point out that the rights of the fourth generation of a person belong to all the rights that have arisen as a result of scientific progress, the development of morality, namely all the so-called "somatic rights", as well as information rights⁴¹.

Based on the above scientific assessments, the human right to use virtual reality in health care should be attributed to the fourth generation of human rights. Such a group of human rights should be formed on the basis of: (1) recognition of the high status of a person; (2) striving for the unity of the norms of law; (3) morality, religion in defining behavior as legal; (4) recognition of the right to the individuality of a person, presupposes respect for the special needs of a person, which provide him with the opportunity to be different from others; (5) the establishment of the

³³ Volynets I. *Cybercrime in health care: demand for protection. Theory and practice of intellectual property*. 2019.3. 113-122.) DOI: <https://doi.org/10.33731/32019.173819>.

³⁴ Nesynova S.V., Knyazeva Yu.S. *The new generation of human rights: current problems of classification*. Bulletin of Alfred Nobel University of Dnepropetrovsk. Legal Sciences Series. 2015. 2 (7). 36-41.

³⁵ Krylova D. *The fourth generation of human rights in the context of the relationship of legal and moral norms*. National law journal: theory and practice. 2017. 2; 26-30.

³⁶ Shebanits D.M. *Modern issues of the theory of "generations of human rights" in the context of European interstate integration*. Scientific Bulletin of Uzhhorod National University: Series: Law. 2015. 1. 31. 57-61.

³⁷ Avramova O., Zhidkova O. *The fourth generation of human rights: problem statement*. Law of Ukraine. 2010.2.101-107.

³⁸ Kruss V. I. *Personal ("somatic") human rights in the constitutional and philosophical and legal dimensions: to the problem statement*. State and Law, 2000. No. 10, pp. 43-50.

³⁹ Shebanits D.M. *Modern issues of the theory of "generations of human rights" in the context of European interstate integration*. Scientific Bulletin of Uzhhorod National University: Series: Law. 2015. 1. 31. 57-61.

⁴⁰ Avramova O., Zhidkova O. *The fourth generation of human rights: problem statement*. Law of Ukraine. 2010.2.101-107.

⁴¹ Barabash O.O. *The fourth generation of human rights: general theoretical characteristics*. Bulletin of the National University "Lviv Polytechnic". Legal sciences. 2016. 837. 213-217.

sovereignty of a person in relation to the state⁴². The human right to health protection as a subjective legal phenomenon, performs a guarantee function in relation to other subjective legal rights (for example, the right to life, the right to personal inviolability). On the other hand, it has other subjective legal rights with its guarantees (for example, the right to information, the right to social protection), and in addition, the healthcare system itself is the basis for restricting other subjective legal human rights⁴³. From our point of view, the human right to use virtual reality in the healthcare sector is to ensure the actions of virtual reality users within the framework of virtual information relations in the healthcare sector, which are regulated by the relevant legal norms.

4. Legal framework for the implementation of the "human right to use virtual reality in healthcare"

The Constitution of Ukraine determines that human rights and freedoms and their guarantees determine the content and direction of the state's activities. The state is responsible to the person for its activities. The establishment and maintenance of human rights and freedoms is the main duty of the state (Article 3)⁴⁴. In accordance with Article 6 of the Fundamentals of Ukrainian Legislation on Healthcare, every citizen of Ukraine has the right to health protection, provides for qualified medical care, a choice of treatment methods⁴⁵.

The International Covenant on Economic, Social and Cultural Rights (1966) proclaims the right of everyone to the highest attainable standard of physical and mental health⁴⁶. The European Union's Charter of Fundamental Rights indicates the application of the "right to personal integrity". Paragraph 1 of Article 3 of the Charter establishes that everyone has the right to their own physical and mental integrity⁴⁷. The European Social Charter provides for: (1) to address, as far as possible, the causes of ill health; (2) provide consulting and educational services aimed at improving health and fostering a sense of personal responsibility for their own health⁴⁸.

⁴² Avramova O., Zhidkova O. *The fourth generation of human rights: problem statement*. Law of Ukraine. 2010.2.101-107.

⁴³ Senyuta I. Ya. *Human right to health care and its legislative support in Ukraine*: dis. ... Cand. jurid. Science: 12.00.01. Lviv, 2006. 215 p.

⁴⁴ Constitution of Ukraine: Law of Ukraine No 254к/96 of 28 June, 1996. Information of the Verkhovna Rada of Ukraine. № 30. Art. 141.

⁴⁵ *Fundamentals of Ukrainian legislation on health care*: Law of Ukraine No. 2801-XII of 19 November, 1992. Information of the Verkhovna Rada of Ukraine.1993. № 4. Art. 19.

⁴⁶ International Covenant on Economic, Social and Cultural Rights of December 16, 1966 UN General Assembly. Available at: https://zakon.rada.gov.ua/laws/show/995_042#Text [Accessed 18 Jan. 2021].

⁴⁷ Charter of Fundamental Rights of the European Union. Available at: http://www.constitution.garant.ru/DOC.3991032.htm#sub_para_N_6000 [Accessed 18 Jan. 2021].

⁴⁸ European Social Charter (revised) Strasbourg, 3 May 1996. Available at: https://zakon.rada.gov.ua/laws/show/994_062#Text [Accessed 18 Jan. 2021].

The Declaration on Patient Rights Policy in Europe (1994) enshrines human rights and human values in the field of health care, for example, the right of every person to respect for their personality, to self-determination, to preserve their secrets, to protect their own health to the extent that existing measures for the prevention and treatment of diseases allow. Section 5 of the Declaration contains the rules governing the provision of health care according to the state of health, including preventive and curative care, if the guarantee of the fulfillment of patient rights is enshrined in section 6. This section of the Declaration on the policy on ensuring the rights of the patient in Europe states, that in the process of providing medical care, the patient can only be subject to such restrictions that do not contradict the principles of human rights and are in accordance with the legislation of the country⁴⁹. In the Lisbon Declaration of the Patient's Rights, adopted in 1981, patients have the right to high-quality medical care, freedom of choice, self-determination, information, confidentiality⁵⁰. Thus, the human right to virtual reality in healthcare should be regulated at the legislative level. It is desirable in Article 6 of the Law of Ukraine "Fundamentals of Ukrainian legislation on healthcare" to provide for the human right to use virtual reality in healthcare.

Legal regulation of virtualization of health care is currently carried out in Ukraine only in the context of legal support for the formation and approval of the electronic health care system. In the Law of Ukraine "On State Financial Guarantees of Medical Services to the Population", the electronic health care system is defined as an information and telecommunication system that provides automation of medical services accounting and medical information management by creating, posting, publishing and exchanging information, data and documents in electronic form, in which includes a central database and electronic medical information systems, between which automatic exchange of information, data and documents is provided through an open program interface (Article 1)⁵¹. Telemedicine is of particular importance in the development of the electronic health care system. The use of telemedicine produces positive results for both patients and doctors. The provision of medical services using telemedicine is carried out through the use of the following forms: (1) telemedicine consultation (2) telemedicine consultation (3) telemetry (4) home teleconsulting (5) performing medical manipulations and operations⁵². In accordance with Article 1 of the Law of Ukraine "Fundamentals of Ukrainian Legislation on Health Care" Telemedicine is a set of actions, technologies and measures used in the provision of medical care using remote communications for the exchange of information in electronic format. Thus, the directions of legal regulation of health virtualization in Ukraine are carried out: (1) due to the

⁴⁹ *Declaration on the Promotion of Patients' Rights in Europe 1994*. Available at: https://www.who.int/genomics/public/eu_declaration1994.pdf [Accessed 16 Jan. 2021].

⁵⁰ *Declaration Of Lisbon On The Rights Of The Patient*. Available at: <https://www.wma.net/policies-post/wma-declaration-of-lisbon-on-the-rights-of-the-patient/> [Accessed 16 Jan. 2021].

⁵¹ On state financial guarantees of medical care: Law of Ukraine of 19.10.2017 № 2168-VIII. Information of the Verkhovna Rada. 2018. № 5. Art.31.

⁵² *Fundamentals of Ukrainian legislation on health care*: Law of Ukraine No. 2801-XII of 19 November, 1992. Information of the Verkhovna Rada of Ukraine.1993. № 4. Art. 19.

introduction of the laws of Ukraine, the provisions of which are aimed at the legal regulation of certain areas of e-health (2) through the development of a number of by-laws, aimed at streamlining special aspects of e-health development, including the introduction of telemedicine; (3) by amending the current legislation regarding the legal regulation of the electronic health care system.

For example, in 2003, California passed the first law requiring operators and web applications to publish a mandatory privacy policy. Certain states have also introduced laws restricting the collection of biometric and geodata from students⁵³. In Ukraine, the laws of Ukraine "On the Basic Principles of Development of the Information Society in Ukraine for 2007-2015", "On the Protection of Personal Data", "On Information", "On State Secrets", as well as Decrees of the President of Ukraine "On the National Coordination cyber security center", "On the Cybersecurity Strategy of Ukraine", etc. So, the Decree of the President of Ukraine "On the Strategy of Cybersecurity of Ukraine" dated January 27, 2016 indicates the need to create conditions for the safe functioning of cyberspace, its use in the interests of the individual, society and the state, and also defines the goals, basic principles of ensuring the cybersecurity of Ukraine, identifies threats cybersecurity⁵⁴.

Examples of the use of VR and AR in healthcare should be brought up. For example, the startup "Vivid Vision", which supports all major virtual reality headsets and helps patients to improve their vision. Patients play VR games on the computer at home or under the supervision of a doctor. The experience is for the treatment of amblyopia (lazy eye), strabismus, and vergence disorders (the eyes do not move together properly). The solution is already used by 88 clinics around the world⁵⁵. The next example is using VRHealth. VRHealth - VR and AR uses and designed for physiotherapy, psychology, cognitive rehabilitation, pain management and coordination disorders. Patients do not need to go to the hospital for testing. This can be done remotely, and when the patient goes to the doctor, his profile is already in the hospital there for diagnosis or treatment. The next example is "ImmersiveTouch". It is a virtual reality solution for training surgeons. This virtual reality platform provides surgeons with a 3D operating experience, allowing them to see and participate in the entire surgical procedure. In addition, doctors can also upload patient scans to VR for detailed surgery planning. Another example, the Psious Toolsuite is used in patients with anxiety disorders. Using a smartphone and virtual reality glasses, patients can easily be transported into a parallel reality that mental health professionals can use in their clinical practice⁵⁶.

⁵³ Afanasyeva, E.A. *Legal regulation of virtual and augmented reality (review)*. Future Law: Intellectual Property, Innovation, Internet, 2018. (1). 167-172.

⁵⁴ Available at: <https://zakon.rada.gov.ua/laws/show/96/2016#Text> [Accessed 17 Jan. 2021].

⁵⁵ What Does It Take to Develop a VR Solution in Healthcare. Available at: <https://www.mddionline.com/augmentedvirtual-reality/what-does-it-take-develop-vr-solution-healthcare> [Accessed 18 Jan. 2021].

⁵⁶ What Does It Take to Develop a VR Solution in Healthcare. Available at: <https://www.mddionline.com/augmentedvirtual-reality/what-does-it-take-develop-vr-solution-healthcare> [Accessed 17 Jan. 2021].

VR is also used in almost every area of practical medicine, however, especially promising at this stage of technology development should be recognized (1) treatment of mental disorders, (2) rehabilitation direction, (3) surgery and (4) ophthalmology. In world practice, the "NeuroTouch Cranio" simulator is being used. It allows not only training to perform brain surgery, but also indicates the mistakes made and evaluates the work of future surgeons. It also created the Pivotal Reality platform based on the Lenovo Mirage Solo, which improves the quality of life for people with dementia. The platform offers a series of immersion 360-degree videos with plots of supposedly everyday activities that are no longer available to patients due to their diagnosis. VR also effectively reduces pain and relieves psychological stress, which is especially important for patients with cancer. Studies have shown that virtual reality programs reduce pain in patients by 48%, while pain relievers - by 10%. A project by FeelsGood and Lenovo in Peru immediately comes to mind, where they jointly developed a way to relieve stress and anxiety in patients. VR is actively used in the treatment of mental disorders. They are effectively used in the treatment of various phobias, paranoia and anxiety, as well as in the process of adaptation of people with autism⁵⁷. Virtual reality can also improve the quality of education for medical students. So, the first virtual reality auditorium in Ukraine is used for anatomy classes. Medical students will have the opportunity to combine lectures and practical lessons using VR systems - a set of technical means that will immerse them in a virtual environment (they will study the structure and properties of human organs while inside them). Among the main problems of health care in Ukraine regarding the implementation of virtual reality in medicine are the problems of security (and cybersecurity), confidentiality, e-commerce and liability of intermediaries, the rights of virtual property in health care. For example, user safety, privacy, freedom of expression, ethics and copyright protection in VR and AR - these areas contain gaps in legal regulation that require legislative intervention⁵⁸. Access to virtual reality in the healthcare sector also has such a phenomenon as inequality. If earlier it was possible to talk about it in the context of the fact that not all people have access to Internet technologies or to digital technologies, now we are talking, first of all, that different people use gadgets in different ways, online space, The use of virtual technologies in healthcare is perceived differently. Also, the spread of virtual reality to the healthcare sector will raise new concerns regarding legal issues like data collection, facial recognition, surveillance and targeted medical advertising, etc.

5. Conclusion

The human right to use virtual reality in healthcare is a universal human right and belongs to the fourth generation of human rights. Cyberspace (virtual space) in

⁵⁷ Virtual surgery and pain relief. Examples of VR – medicine. Available at: <https://nv.ua/ukr/biz/experts/vr-tehnologiji-v-medicini-shcho-v-sviti-i-shcho-v-ukrajini-50060805.html> [Accessed 18 Jan. 2021].

⁵⁸ Afanasyeva, E.A. *Legal regulation of virtual and augmented reality (review)*. Future Law: Intellectual Property, Innovation, Internet, 2018. (1). 167-172.

the healthcare sector is an environment that provides opportunities for the implementation of public relations in medicine, formed as a result of the functioning of unified communication systems in the healthcare sector and provides opportunities for the implementation of electronic communications in order to provide medical services using the Internet. Virtual reality technologies immerse a person (patient) in a computer environment that imitates reality through the use of interactive devices, send and receive information and wear them in the form of glasses, headsets.

The human right to use virtual reality in healthcare is to ensure the actions of virtual reality users within the framework of virtual information relations in the healthcare sector, which are governed by the relevant legal norms. The human right to virtual reality in healthcare should be regulated at the legislative level. So, in the Law of Ukraine "Fundamentals of Ukrainian legislation on health care" in Article 6, it is necessary to provide for "the human right to use virtual reality in health care."

Providing medical services using virtual reality improves the quality of life of patients. Virtual reality in healthcare is practiced in the following areas: (1) medical training and education, (2) surgical modeling, (3) cognitive rehabilitation, (4) psychotherapy and psychology, (5) ophthalmology, (6) physiotherapy, (7) pain management and coordination disorders, (8) telemedicine, (9) sports medicine, etc. Among the main legal problems of health care in Ukraine regarding the implementation of virtual reality in medicine are the problems of security, electronic medical commerce, the protection of personal data of patients, medical information, and the rights of virtual property and liability of intermediaries, confidentiality.

Bibliography

1. Avramova O., Zhidkova O. *The fourth generation of human rights: problem statement*. Law of Ukraine. 2010.2.101-107.
2. Afanasyeva, E.A. *Legal regulation of virtual and augmented reality (review)*. Future Law: Intellectual Property, Innovation, Internet, 2018. (1). 167-172.
3. Barabash O.O. *The fourth generation of human rights: general theoretical characteristics*. Bulletin of the National University "Lviv Polytechnic". Legal sciences. 2016. 837. 213-217.
4. Bachilo I.L. *Information law. Role and place in the legal system of the Russian Federation*. State and law. 2001.2.5-14.
5. Belyakov K.I. *Conceptual and methodological bases of regulation of new types of information relations: "virtual legal relations"*. Lex Portus 2016. 2. 47-63.
6. Volynets I. *Cybercrime in health care: demand for protection*. Theory and practice of intellectual property. 2019.3. 113-122. DOI: <https://doi.org/10.33731/32019.173819>.
7. Zaslavska, O. O. *Visualization of political communication space: peculiarities and tendencies*. Scientific and Theoretical Almanac Grani, 2016,. 19(8), 90-99. <https://doi.org/10.15421/171657>.
8. Kovalenko A.Yu. *Legal grounds for the formation of complex branches of law*. History of State and Law. 2015. 22. 44-46.
9. Krylova D. *The fourth generation of human rights in the context of the relationship of legal and moral norms*. National law journal: theory and practice. 2017. 2; 26-30.

10. Kruss V. I. *Personal ("somatic") human rights in the constitutional and philosophical and legal dimensions: to the problem statement*. State and Law, 2000. No. 10. P. 43-50.
11. Kuznetsov V.A., Russu Yu.G., Kupriyanovskiy V.P. *On the use of virtual and augmented reality*. International Journal of Open Information Technologies. 2019. 7. (4). p. 75.
12. Nesinova S.V., Knyazeva Yu.S. *The new generation of human rights: current problems of classification*. Bulletin of Alfred Nobel University of Dnepropetrovsk. Legal Sciences Series. 2015. 2 (7). 36-41.
13. On state financial guarantees of medical care: Law of Ukraine of 19.10.2017 № 2168-VIII. Information of the Verkhovna Rada. 2018. № 5. Art.31.
14. About the main ambush of the cybersecurity of Ukraine: the Law of Ukraine dated 05.10.2017. Available at: <https://zakon.rada.gov.ua/laws/show/2163-19#Text> [Accessed 18 Jan. 2021].
15. On telecommunications: Law of Ukraine of 18.11.2003 № 1280-IV. Information of the Verkhovna Rada of Ukraine. 2004. № 12. Art.155. <https://zakon.rada.gov.ua/laws/show/1280-15#Text> [Accessed 18 Jan. 2021].
16. Senyuta I. Ya. *Human right to health care and its legislative support in Ukraine: dis. ... Cand. jurid. Science: 12.00.01*. Lviv, 2006. 215 p.
17. Cybersecurity Strategy of Ukraine: Decree of the President of Ukraine of March 15, 2016 № 96/2016. Available at: <https://zakon.rada.gov.ua/laws/show/96/2016#Text>[Accessed 17 Jan. 2021].
18. N.I.Matuzov, A.V.Malko, *Theory of state and law: textbook*. Moscow, Lawyer, 2004, 512 p.
19. Khabrieva T.Ya., Chernogor N.N. *Law in the context of digital reality*. Journal of Russian Law. 2018.1.85-102.
20. Shebanits D.M. *Modern issues of the theory of "generations of human rights" in the context of European interstate integration*. Scientific Bulletin of Uzhhorod National University: Series: Law. 2015. 1. 31. 57-61.
21. Bellani, M., Fornasari, L., Chittaro, L., & Brambilla, P. *Virtual reality in autism: state of the art*. Epidemiology and psychiatric sciences, 2011 20(3), 235-238. <https://doi.org/10.1017/s2045796011000448>.
22. *Charter of Fundamental Rights of the European Union*. Available at: http://www.constitution.garant.ru/DOC.3991032.htm#sub_para_N_6000 [Accessed 18 Jan. 2021].
23. *Constitution of Ukraine*: Law of Ukraine No 254к/96 of 28 June, 1996. Information of the Verkhovna Rada of Ukraine. № 30. Art. 141.
24. *Declaration of Lisbon on the Rights of the Patient*. Available at: <https://www.wma.net/policies-post/wma-declaration-of-lisbon-on-the-rights-of-the-patient/>[Accessed 16 Jan. 2021].
25. *Declaration on the Promotion of Patients' Rights in Europe 1994*. Available at: https://www.who.int/genomics/public/eu_declaration1994.pdf [Accessed 16 Jan. 2021].
26. *European Social Charter (revised) Strasbourg, 3 May 1996*. Available at: https://zakon.rada.gov.ua/laws/show/994_062#Text [Accessed 18 Jan. 2021].
27. *Fundamentals of Ukrainian legislation on health care*: Law of Ukraine No. 2801-XII of 19 November, 1992. Information of the Verkhovna Rada of Ukraine.1993. № 4. Art. 19.
28. Gerup, J., Soerensen, C. B., & Dieckmann, P. *Augmented reality and mixed reality for healthcare education beyond surgery: an integrative review*. International journal of medical education, 2020. 11, 1-18. <https://doi.org/10.5116/ijme.5e01.eb1a>.

29. Holden M. K. *Virtual environments for motor rehabilitation: review*. *Cyberpsychology behave.*, 2005. 8(3), 187-219. <https://doi.org/10.1089/cpb.2005.8.187>.
30. *Increasing the availability of medical technologies and innovations. At the intersection of healthcare, intellectual property and trade* (2013). World Health Organization, World Intellectual Property Organization and World Trade Organization. Available at: https://www.wipo.int/edocs/pubdocs/ru/wipo_pub_628.pdf [Accessed 18 Jan. 2021].
31. *International Covenant on Economic, Social and Cultural Rights of December 16, 1966* UN General Assembly. Available at: https://zakon.rada.gov.ua/laws/show/995_042#Text [Accessed 18 Jan. 2021].
32. Khan, R., Plahouras, J., Johnston, B. C., Scaffidi, M. A., Grover, S. C., & Walsh, C. M. *Virtual reality simulation training in endoscopy: a Cochrane review and meta-analysis*. *Endoscopy*, 2019. 51(7), 653-664. <https://doi.org/10.1055/a-0894-4400>
33. Kovtun K. *Using VR and AR to manage businesses in the medical field*. 2020. 3(37). 100-109. Available at: <http://journal.bsau.ru/upload/iblock/924/9244765c276f8ad0433f6b9cb34e0c0d.pdf> [Accessed 18 Jan. 2021].
34. Kuhlen, T., Dohle, C. *Virtual reality for physically disabled people*. *Computers in Biology and Medicine*, 1995. 25, 2, 205-211. [https://doi.org/10.1016/0010-4825\(94\)00039-S](https://doi.org/10.1016/0010-4825(94)00039-S).
35. Lemley, M A. Volokh, E. *Law, Virtual Reality, and Augmented Reality*. *University of Pennsylvania Law Review*, 2018. 166, P.5. Available at: <https://ssrn.com/abstract=2933867>[Accessed 18 Jan. 2021].
36. Lessig L. *Code and Other Laws of Cyberspace*. New York. Basic Books. 1999. 203 p.
37. Lowood, H. E. *Virtual reality*. *Encyclopedia Britannica*. Available at: <https://www.britannica.com/technology/virtual-reality> [Accessed 18 Jan. 2021].
38. Mamychev, A., Dremluga, R. *Crimes in VR*. *Revista Dilemas Contemporáneos: Educación, Política y Valores*, 2019, 1(129), 1-14.
39. Park J.-M., & Noh G.-Y. *The effects of vr simulation game on driving fear and efficacy*. *JP Journal of Heat and Mass Transfer*. 2018. 15 (Spec. Is. 2). pp. 161-169.
40. Pottle J. *Virtual reality and the transformation of medical education*. *Future healthcare journal*, 2019. 6(3), 181-185. <https://doi.org/10.7861/fhj.2019-0036>.
41. Samadbeik, M., Yaaghobi, D., Bastani, P., Abhari, S., Rezaee, R., & Garavand, A. *The Applications of Virtual Reality Technology in Medical Groups Teaching*. *Journal of advances in medical education & professionalism*, 2018.6(3), 123-129.
42. Tang, K. S., Cheng, D. L., Mi, E., & Greenberg, P. B. *Augmented reality in medical education: a systematic review*. *Canadian medical education journal*, 2020. 11(1), e81-e96. <https://doi.org/10.36834/cmej.61705>
43. *The first medical audience of virtual reality in Ukraine*. Available at: <http://www.golos.com.ua/article/328103> [Accessed 18 Jan. 2021].
44. *Virtual surgery and pain relief. Examples of VR – medicine*. Available at: <https://nv.ua/ukr/biz/experts/vr-tehnologiji-v-medicini-shcho-v-sviti-i-shcho-v-ukrajini-50060805.html> [Accessed 18 Jan. 2021].
45. *What Does It Take to Develop a VR Solution in Healthcare*. Available at: <https://www.mddionline.com/augmentedvirtual-reality/what-does-it-take-develop-vr-solution-healthcare> [Accessed 18 Jan. 2021].
46. Yuan S., & Ip H. *Using virtual reality to train emotional and social skills in children with autism spectrum disorder*. *London Journal of Primary Care*. 2018. 10 (4). pp. 110-112.