SILESIAN UNIVERSITY OF TECHNOLOGY PUBLISHING HOUSE

SCIENTIFIC PAPERS OF SILESIAN UNIVERSITY OF TECHNOLOGY 2025
ORGANIZATION AND MANAGEMENT SERIES NO. 233

THE USE OF NEW TECHNOLOGIES AVAILABLE IN POLISH HEALTHCARE SYSTEM BY INHABITANTS OF SILESIA

Małgorzata NADZIAKIEWICZ[1*], Barbara PROFASKA[2]

[1] Silesian University of Technology, Faculty of Organization and Management;
malgorzata.nadziakiewicz@polsl.pl, ORCID: 0000-0002-0900-404
[2] Silesian University of Technology, Faculty of Organization and Management; barbpro505@student.polsl.pl
* Correspondence author

Purpose: This research aims to analyze the awareness of the inhabitants of Silesia regarding the use of the selected new technologies in the Polish healthcare system, as, according to Polish law, all Polish citizens are entitled to equal access to healthcare services regardless of their financial situation and information about the scope and type of health services provided by various healthcare institutions.
Design/methodology/approach: Online survey, 20 questions, focuses on the inhabitants of Silesia, a southern Polish voivodeship, with Katowice as its capital, covering an area of 12,334 km^2 and home to approximately 4.4 million people, based on the results of the National Population and Housing Census conducted in 2021 by the Central Statistical Office of Poland.
Findings: The work presented a general overview of the selected new technologies utilized in Polish healthcare, providing information on their purpose, a general idea of how they work, the benefits of their use, and possible challenges or disadvantages of their implementation. The conducted research points out that the Silesia inhabitants do not have a high level of awareness regarding the use of new healthcare technologies in Poland, which means that appropriate actions should be taken by local authorities and medical institutions to promote information and educate Silesia inhabitants on the use and implementation of the new healthcare technologies in Poland.
Research limitations/implications: To gather the relevant data, an online survey was conducted using Google Forms to provide a numerical overview of the characteristics of a sample of the Silesia inhabitants population. The survey consisted of 20 questions, 5 on demographics and 15 questions focused on assessing respondents' awareness of new healthcare technologies.
Practical implications: The research results can help to understand how new technologies are used in the Polish healthcare system and what is the awareness of use new technologies in Silesia.
Originality/value: The work shows a general overview of the selected new technologies in patient healthcare, paper presents new attitude. It is addressed to healthcare organization, doctors, researchers and public institutions.
Keywords: new technologies, Polish healthcare system, new technological solutions in medicine.
Category of the paper: research paper**.**

1. Introduction

Poland's healthcare system has undergone dynamic changes in recent years, with some of its aspects particularly due to the impact of the COVID-19 pandemic. One of the key factors of this progress is the implementation of various new technologies, regarded as innovative methods that outperform the existing ones, enhancing patient care, improving access to medical care, and efficiency in the provision of medical care.

This research aims to analyze the awareness of the inhabitants of Silesia regarding the use of the selected new technologies in the Polish healthcare system, as, according to Polish law, all Polish citizens are entitled to equal access to healthcare services regardless of their financial situation and information about the scope and type of health services provided by various healthcare institutions (Kancelaria Sejmu RP, 1997, 2020). The study focuses on the inhabitants of Silesia, a southern Polish voivodeship, with Katowice as its capital, covering an area of 12,334 km^2 and home to approximately 4.4 million people, based on the results of the National Population and Housing Census conducted in 2021 by the Central Statistical Office of Poland (Główny Urząd Statystyczny, 2022).

To gain insight into the awareness of Silesia inhabitants regarding the use of new technologies in Poland's healthcare system, the following hypotheses were formulated:

The Silesia inhabitants have a high level of awareness of the new technologies used in Poland's healthcare system. The Internet Patient Account services are the most commonly used new technological solutions in Polish healthcare. The prior positive experience using one of the new healthcare technologies implemented in Poland makes individuals more likely to trust them and more willing to try those they are not familiar with. The primary means of accessing information among Silesian inhabitants regarding the use of new technologies in Poland's healthcare are internet sources, which are also the preferred tool for raising public awareness. Silesia inhabitants prefer to use new healthcare technologies more in comparison to traditional methods, and they support their widespread implementation in Poland. A patient using medical services expects a product, i.e. a service that conforms to the parameters about which he or she has been previously informed and a reproducible level of quality of these services (Nadziakiewicz, 2018) Both quality and marketing are directed in their activities and goals towards the recipient, the user (Nadziakiewicz, Mikolajczyk, 2019).

2. New technologies used in Poland's healthcare system

2.1. E-health

The incorporation of digital technologies into healthcare has strengthened patient understanding of medical advice and empowered individuals to manage their health more actively. One of the new healthcare technologies utilized in Poland, leveraging digital technologies, are e-health services, defined by the WHO as the safe and efficient application of communication and information technologies, which serve to improve various areas in relation to healthcare, such as medical care, health monitoring, medical research, patient education, and information sharing (World Health Organization Eastern Mediterranean Region, 2025). In Poland, the Ministry of Health is responsible for overseeing the development of e-health services, including solutions such as Internet Patient Account (IKP), telemedicine, and mobile health solutions (mHealth) (Babraj, 2018).

Launched in 2018, IKP serves to consolidate patients' medical information, offering digital access to services, such as:

- E-prescriptions (electronic replacements for traditional paper prescriptions).
- E-referrals (digital referrals generally issued for specialized medical care).
- Electronic sick leaves (automatically delivered to appropriate recipients, that is, employers and insurers).
- Electronic health records (patients' centralized medical documentation) (Centrum e-Zdrowia, 2023; Łuszczyńska, 2018).

Telemedicine allows the provision of remote medical services, such as doctor's appointments, with the utilization of telecommunication technologies, like audio and video devices (Kirch, 2008). The most common form of telemedicine service in Poland is teleconsultation, a medical consultation between a patient and a doctor, nurse, or midwife, usually carried out via phone calls, video calls, or e-mail (Ministerstwo Zdrowia, 2020). The healthcare facilities providing primary health services in Poland had the obligation to enable patients to utilize teleconsultations since January 2020; the process of which was significantly sped up in March 2020 during the COVID-19 pandemic to reduce in-person visits and limit infection risk (Narodowy Fundusz Zdrowia, 2020).

Mobile health is a branch of e-health that utilizes mobile devices and wearable technology to monitor and transfer patients' health-related data, including blood pressure, heart rate, and blood glucose levels (Adibi, 2015). The mHealth solutions help maintain a healthy lifestyle or manage pre-existing health conditions. In Poland, mHealth solutions include applications certified as medical devices by the Ministry of Health and wearable devices possessing the ability to identify, analyze, and transfer the user's health-related data that work together with mHealth applications (Ministerstwo Zdrowia, 2022; Moorthy et al., 2024).

2.2. Medical robots

Medical robots are reprogrammable and versatile manipulators of various structures, sizes, and autonomy of operation, used in healthcare to carry out various tasks, primarily in surgery or rehabilitation (Beasley, 2012). They can be divided into two categories based on their purpose: robots that assist medical personnel, as they can automate repetitive tasks and perform highly accurate and precise movements (e.g., surgical, laboratory, and pharmacotherapy robots), and robots that assist patients in improving their quality of life (e.g., rehabilitation robots, exoskeletons, and robotic prostheses).

In Poland, the utilization of surgical robots first started in 2010 with a surgery conducted with the use of the da Vinci surgical robot, in a Wrocław hospital, a city located in Dolnośląskie voivodeship (Izba POLMED, 2025). Initially, the use of medical robots was limited to the private sector; however, it expanded significantly after the public healthcare system introduced, in 2022, dedicated funding for robot-assisted surgeries by public payers (Izba POLMED, 2025). As a result, the number of hospitals offering robotic surgeries continuously rose, marking a significant improvement in recent years from 40 hospitals in 2022 to 58 in 2023, with performed procedures increasing from 4844 to 10,110 (Jakubiak, Sujecki, 2024). In Poland, common applications of robot-assisted surgeries include urology (primarily prostatectomy), gynecology (mainly gynecologic oncology), and gastroenterology (mainly colorectal cancer). In Poland, medical facilities use many types of medical robots. When it comes to surgical robots, there are two most commonly utilized: the da Vinci (in 45 hospitals) and Versius (in 13 hospitals) (Jakubiak, Sujecki, 2024). In addition to imported surgical robot systems, Polish institutions are developing their own solutions, such as the Robin Heart system created by the Biocybernetics Laboratory and the Foundation of Cardiac Surgery Development, located in Zabrze, which aims to support cardiac surgery, though it still requires funding to reach the production stage (Zdrojewicz et al., 2014). However, there are medical robots made by Polish companies that are already available on the market, for example, medical robots of EGZOTech, a Polish company, which develops and manufactures rehabilitation robots to strengthen muscles, improve patients' motor functions, or restore range of motions (EGZOTech, 2025).

Apart from the increasing number of medical institutions that perform robot-assisted surgeries, there are also efforts to advance the field, including the establishment of the Polish Group of Robotic Surgery, Artificial Intelligence, and Telemedicine, which promotes research, maintains a national robot surgery registry, and offers education on the use of robotics in medicine (Ministerstwo Nauki i Szkolnictwa Wyższego, 2025).

2.3. Immersive Technologies

Immersive technologies, that is, the use of technologies, such as virtual reality (VR) augmented reality (AR), and mixed reality (MR) that serve to create an immersive and interactive, three-dimensional user experience or incorporate the digital information into the

real world, enhancing rather than replacing an individual's perception of their surroundings, are increasingly impacting Polish healthcare; however, their widespread implementation is in its early stages (Lowood, 2025; Hayes, Downie, 2024). Immersive technologies in Poland are especially used for:

- Surgical planning, through VR simulations or AR goggles that project 3D holograms onto the patient's body, helping visualize internal structures and plan access routes to the operated area.
- Rehabilitation, by engaging patients in interactive VR exercises, which are especially useful for those facing long wait times for traditional therapy in medical institutions.
- Psychological therapy, by exposing patients to controlled virtual environments that help manage anxiety, trauma, and mood disorders, reducing stress and boosting the resilience of patients.
- Pain and stress relief, especially for diverting children's attention during medical procedures.
- In education, to allow Polish healthcare students and medical professionals to practice their skills in realistic, risk-free virtual environments, improving learning, critical thinking, and teamwork.

Though still in the beginning phase, immersive technology in Polish healthcare shows strong potential to transform patient care and medical education.

2.4. Laser technology

Laser technology plays an important role in Polish healthcare, together with ongoing efforts to increase the number of medical lasers in medical facilities and integrate them with other technologies, such as artificial intelligence, to make them more efficient.

Medical lasers are devices that produce a thin and coherent beam of light in a very controlled way and at a specific wavelength, used in place of traditional surgical tools (Hecht, 2025). The medical lasers' interaction with tissue, depending on the laser and tissue characteristics, allows the performance of various functions during surgery, like tissue coagulation or ablation, offering minimally invasive procedures. In Poland, lasers are used across various medical fields, including:

- Dermatology – for removing lesions, tattoos, scars, wrinkles, etc.
- Ophthalmology – for vision correction, corneal transplants, glaucoma and cataracts treatment, etc.
- Neurology – for treating brain tumors and epilepsy, etc.
- Urology – for fragmentation of kidney, ureter, and bladder stones, etc.
- Dentistry – for soft and hard tissue surgeries, reducing swelling, etc.

The implementation of lasers in a larger number of medical facilities, their increased application in various medical procedures, and new advancements such as the procurement of the first of its kind in Poland AI-assisted laser for glaucoma treatment, continue to contribute to the increase in the importance of medical lasers in Polish healthcare.

3. Research

To gather the relevant data, an online survey was conducted using Google Forms to provide a numerical overview of the characteristics of a sample of the Silesia inhabitants population. The survey consisted of 20 questions, 5 on demographics and 15 questions focused on assessing respondents' awareness of new healthcare technologies. For this research, first, a convenience sampling technique was utilized, as the author distributed online surveys to acquaintances of various ages and educational backgrounds. At the same time, the initial online survey participants were asked to send the survey to other individuals, thereby utilizing the snowball sampling technique. This process continued until the appropriate number of answers was obtained.

A total of 127 responses were collected, all from Silesia inhabitants:

- Gender: 49.6% female, 49.6% male, 0.8% undisclosed.
- Age: Most respondents were aged 45-54 (26%), followed by 35-44 (25.2%), and 18-24 (19.7%). There was also a significant number of respondents above 65 years old (10.2%), the 25-34 year olds (8.7%), the 55-64 year olds (8.7%), and under 18 years of age (1.6%).
- Location: 38.6% lived in cities under 50,000 inhabitants, 27.6% in villages, 19.7% in cities of 100,000-200,000 inhabitants, 12.6% lived in cities between 50,000 and 100,000 inhabitants, and 1.6% lived in cities over 200,000 inhabitants.
- Education: 49.6% had secondary education, 46.5% higher education, and 3.9% primary education.

The Silesia inhabitants have not a high level of awareness of new technologies used in Poland's healthcare system, only 38.5% of respondents felt well-informed about new technologies used in the Polish healthcare system, while 41.7% disagreed with this statement, and 19.7% of respondents remained undecided. Moreover, 54% indicated that they do not understand how new healthcare technologies work, with only 30% feeling confident in their understanding, and 16% remaining undecided. In addition, while awareness of more commonly used new healthcare technologies in Poland, such as various e-health services, is relatively widespread, awareness of emerging or specialized advanced technologies, such as virtual and augmented reality or medical robots, is considerably lower. This indicated inconsistent and

generally low awareness among Silesia inhabitants, highlighting the need for targeted education and improved communication strategies.

The Internet Patient Account services are the most commonly used new technological solutions in Polish healthcare. 91.3% of respondents have used Internet Patient Account services at least once, making it the most commonly used new healthcare technology among the surveyed, with only a few reporting no use at all (8.7%). This significantly exceeds the reported usage of the second most utilized technology, according to the survey, which is telemedicine (77.2%), and other technologies (mHealth devices – 36.2%, VR and AR solutions – 1.6%, medical lasers – 8.7%, medical robots – 3.1%), which showed an even more drastic decline in use among survey participants. The prior positive experience using one of the new healthcare technologies implemented in Poland makes individuals more likely to trust them and more willing to try those they are not familiar with, 70% of respondents had a generally positive experience with new healthcare technologies, only 5.5% reported negative experiences, and the remaining were neutral. The vast majority (70.1%) indicated that their prior experience made them more open to using unfamiliar technologies, while 7.1% reported that their experience did not increase their willingness to try other new healthcare technologies, and 22.8% were neutral. Moreover, 75.6% of respondents expressed trust in new healthcare technologies implemented in Poland, only 6.2% reported a lack of trust, and the remaining were neutral. Positive experience strongly correlated with increased trust and willingness to adopt innovations. In contrast, negative or neutral experiences were linked to lower trust and openness.

The primary means of accessing information among Silesian inhabitants regarding the use of new technologies in Poland's healthcare are not internet source. Online news (50.4%), social media (42.5%), and personal networks (43.3%) were indicated as the most commonly used sources for information about new healthcare technologies, they are not seen as the most effective for raising public awareness. Respondents favored local media campaigns (69.3%) and the implementation of educational materials in public spaces (50.4%). Digital sources like medical institution websites, webinars, or podcasts, and local educational programs received comparatively less support. Thus, although internet sources are widely used to look for relevant information, they are not preferred for raising public awareness.

Silesia inhabitants prefer to use new healthcare technologies more in comparison to traditional methods, and they support their widespread implementation in Poland.

Most respondents (62.2%) prefer to use new healthcare technologies over traditional methods, while only 20.4% favor traditional methods, and the remaining were undecided. Additionally, 76.4% support wider use of those innovations in Poland, with only 4.7% expressing opposite views, and 18.9% not having an opinion. This overwhelming support further affirms the Silesia inhabitants' readiness to embrace technological advancements in healthcare and their willingness to see such innovations implemented on a broader scale.

4. Recommendation

The findings of this study pointed out a limited and uneven level of awareness among Silesia inhabitants regarding new healthcare technologies implemented in Poland, several actions are recommended to address the identified knowledge gaps, foster public engagement, and enhance public awareness through strategic information dissemination. The recommendations on the information dissemination regarding the use of new technologies in the Polish healthcare system are based on the findings of this study regarding the most effective way of raising the awareness of Silesia inhabitants regarding the new healthcare technologies (see Table 1).

Table 1.
Actions most likely to improve the awareness of Silesia inhabitants regarding the use of new technologies in Polish healthcare

Action	Respondent's approval (in percentage)
Information campaigns in local media	69.3%
Promotion of new technologies on the health institutions' websites	41.7%
Free webinars and podcasts on new technologies	20.5%
Provision of educational materials in the form of leaflets, posters, or infographics in public places	50.4%
Implementation of local educational programs	27.6%
Other	3.9%

4.1. Local Media Information Campaigns

Given the trust and familiarity with local media outlets, such as television, radio stations, and newspapers, they can serve as a crucial tool for the dissemination of accurate and accessible information about healthcare innovations in Poland. Regional and national health authorities should design and implement comprehensive information campaigns in local media aimed at increasing awareness and understanding of both established and emerging healthcare technologies. These campaigns should employ easy-to-understand explanations and put particular emphasis on technologies that are less familiar to the public. The information campaigns in local media regarding the implementation and use of new healthcare technologies in Poland can be disseminated, e.g., with the use of public service announcements, expert interviews, or short documentary segments.

4.2. Public Educational Materials

Government agencies and healthcare providers should also develop targeted, user-friendly educational materials in the form of leaflets, posters, or infographics implemented in public places, aiming to clarify the purpose, advantages, and usage of various healthcare technologies. The deployment of visually engaging educational materials, especially across high-traffic public areas, such as public transportation hubs, libraries, pharmacies, medical institutions, libraries, or city halls, offers a passive yet effective method of knowledge dissemination.

4.3. Information Dissemination via Healthcare Institutions' Websites

Healthcare professionals should be encouraged and trained to act as intermediaries in informing patients about new healthcare technologies. However, as not to overwhelm them, such information could be distributed by the provision of leaflets during medical check-ups or through healthcare institutions' medical websites. The healthcare institutions, as an authoritative source of medical information, can offer reliable, up-to-date information on their official websites. It can be done by, e.g., creating dedicated sections that explain current and upcoming new technological implementations, in addition, allowing the institutions to directly address public uncertainties through interactive FAQs, explanatory videos, or guides.

Together, local media, public spaces, and digital platforms can offer a proactive and inclusive form of information dissemination regarding the use of new healthcare technologies in Poland. These strategic methods can meaningfully contribute to closing the knowledge gap identified among Silesia inhabitants and prepare them for engagement with technological innovations in Polish healthcare. However, it is immensely important that all the facilitated information is credible, helps normalize the discourse around healthcare innovations, and stimulates public interest and trust in these developments. Moreover, regular assessments of public awareness should be conducted to monitor the effectiveness of the educational initiatives, allowing for adjustments to ensure that the undertaken efforts remain effective and align with the public's needs.

5. Conclusion

The work presented a general overview of the selected new technologies utilized in Polish healthcare, providing information on their purpose, a general idea of how they work, the benefits of their use, and possible challenges or disadvantages of their implementation. The conducted research points out that the Silesia inhabitants do not have a high level of awareness regarding the use of new healthcare technologies in Poland, which means that appropriate actions should be taken by local authorities and medical institutions to promote information and educate Silesia inhabitants on the use and implementation of the new healthcare technologies in Poland. It was established that the Internet Patient Account is the most commonly utilized new technological solution by Silesia inhabitants. It was also confirmed that the prior positive experience with one of the new healthcare technologies implemented in Poland makes individuals more likely to trust them and be more willing to utilize those they are not well aware of. This leads to the conclusion that for the Silesia inhabitants to keep trust in the new healthcare technologies and be open to trying those they are not familiar with, the medical institutions need to ensure that the patients have a positive

experience with the new healthcare technologies. It was estimated that Silesia inhabitants primarily access information regarding the use of new technologies in Poland's healthcare through internet sources; however, they prefer more traditional methods of sharing such information to raise public awareness, indicating that the best way of educating Silesia inhabitants is though information campaigns in local media, with the use of public educational materials, or by disseminating information via healthcare institutions' websites. Lastly, it was confirmed that the Silesia inhabitants prefer to use new healthcare technologies over traditional methods, and they support further implementation of those technologies in the Polish healthcare system, positively influencing the overall development of the Polish healthcare system. In conclusion, this study highlights the growing presence and potential of new healthcare technologies in Poland, despite the significant gap in Silesia inhabitants' awareness and understanding, those individuals show a strong preference for new healthcare technologies and support their broader implementation, signaling a favorable outlook for the continued advancement of healthcare system in Poland.

References

1. Adibi, S. (2015). Mobile Health. A Technology Roadmap. *Springer Series in Bio-Neuroinformatics, vol. 5*. Cham: Springer, pp. 1-2. DOI: https://doi.org/10.1007/978-3-319-12817-7
2. Babraj, R. (2018, March 13). *Informatyzacja w Ochronie Zdrowia*. Retrieved from: https://www.gov.pl/web/zdrowie/informatyzacja-w-ochronie-zdrowia?utm
3. Beasley, R. (2012). Medical Robots: Current Systems and Research Directions. *Journal of Robotics, p. 1*. DOI: 10.1155/2012/401613
4. Centrum e-Zdrowia (2023, April 03). *17 000 000 x IKP*. Retrieved from: https://pacjent.gov.pl/archiwum/2023/17000000-x-ikp
5. EGZOTech (accessed 2025, May 22). *Robotyka w rehabilitacji ortopedycznej*. Retrieved from: https://www.egzotech.com/pl/ortopedia/
6. Główny Urząd Statystyczny (2022). Informacja o wynikach Narodowego Spisu Powszechnego Ludności i Mieszkań 2021 na poziomie województw, powiatów i gmin. *Narodowy Spis Powszechny Ludności i Mieszkań 2021*, p. 2. Retrieved from: https://stat.gov.pl/spisy-powszechne/nsp-2021/nsp-2021-wyniki-ostateczne/informacja-o-wynikach-narodowego-spisu-powszechnego-ludnosci-i-mieszkan-2021-na-poziomie-wojewodztw-powiatow-i-gmin,1,1.html
7. Hayes, M., Downie, A. (2024, April 08). *What is augmented reality?* Retrieved from: https://www.ibm.com/think/topics/augmented-reality

8. Hecht, J. (2025, March 19). *Laser*. Retrieved from: https://www.britannica.com/technology/laser
9. Izba POLMED (2025, March 19). *Roboty medyczne. Stan obecny i przyszłość robotyki w opiece zdrowotnej w Polsce.* Retrieved from: https://polmed.org.pl/juz-jest-raport-izby-polmed-roboty-medyczne-stan-obecny-i-przyszlosc-robotyki-w-opiece-zdrowotnej-w-polsce/
10. Jakubiak, K., Sujecki, D. (2024). *Chirurgia Robotowa*. Modern Healthcare Institute, mZdrowie.pl, pp. 9-33. Retrieved from: https://www.mzdrowie.pl/medycyna/chirurgia-robotowa/
11. Kancelaria Sejmu RP (1997). *Konstytucja Rzeczypospolitej Polskiej z dnia 2 kwietnia 1997 r. Dz.U. no. 78, pos. 483,* p. 2427. Retrieved from: https://isap.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=wdu19970780483
12. Kancelaria Sejmu RP (2020). *Obwieszczenie Marszałka Sejmu Rzeczypospolitej Polskiej z dnia 4 maja 2020 r. w sprawie ogłoszenia jednolitego tekstu ustawy o prawach pacjenta i Rzeczniku Praw Pacjenta.* Dz.U. pos. 849, p. 5. Retrieved from: https://isap.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WDU20200000849
13. Kirch, W. (ed.) (2008). *Telemedicine*. Encyclopedia of Public Health. Dordrecht: Springer, pp. 1384-1385. DOI: https://doi.org/10.1007/978-1-4020-5614-7_3462
14. Lowood, H.E. (2025, May 23). *Virtual reality*. Encyclopedia Britannica. Retrieved from: https://www.britannica.com/technology/virtual-reality
15. Łuszczyńska, K. (2018, June 28). *Internetowe Konto Pacjenta – szybki i łatwy dostęp do danych medycznych.* Retrieved from: https://www.gov.pl/web/zdrowie/internetowe-konto-pacjenta-szybki-i-latwy-dostep-do-danych-medycznych
16. Ministerstwo Nauki i Szkolnictwa Wyższego (2025, February 11). *Technologia w służbie zdrowia: Powstała Polska Grupa Chirurgii Robotowej, Sztucznej Inteligencji i Telemedycyny.* Retrieved from: https://www.gov.pl/web/nauka/technologia-w-sluzbie-zdrowia-powstala-polska-grupa-chirurgii-robotowej-sztucznej-inteligencji-i-telemedycyny
17. Ministerstwo Zdrowia (2020, August 17). *Teleporady – zbiór zasad i dobrych praktyk dla lekarzy POZ.* Retrieved from: https://www.gov.pl/web/zdrowie/teleporady---zbior-zasad-i-dobrych-praktyk-dla-lekarzy-poz
18. Ministerstwo Zdrowia (2022, August 08). *Komunikat Ministra Zdrowia w sprawie przyznawania aplikacji tytułu "Aplikacja Certyfikowana MZ" oraz włączania do "Portfela Aplikacji Zdrowotnych" (PAZ).* Retrieved from: https://www.gov.pl/web/zdrowie/komunikat-ministra-zdrowia-w-sprawie-przyznawania-aplikacji-tytulu-aplikacja-certyfikowana-mz-oraz-wlaczania-do-portfela-aplikacji-zdrowotnych-paz
19. Moorthy, P., Weinert, L., Schüttler, C., Svensson, L., Sedlmayr, B., Müller, J., Nagel, T. (2024, April 05). Attributes, Methods, and Frameworks Used to Evaluate Wearables and Their Companion mHealth Apps: Scoping Review. *JMIR Mhealth Uhealth, vol. 12.* DOI: 10.2196/52179

20. Nadziakiewicz, M. (2018). Marketing a jakość usług medycznych na przykładzie placówki regionu Górnego Śląska. *Zeszyty Naukowe Politechniki Śląskiej. Organizacja i Zarządzanie*, pp. 313-324. https://doi.org/10.29119/1641-3466.2018.129.22
21. Nadziakiewicz, M., Mikolajczyk, A. (2019). The quality and safety of health care services. *Management Systems in Production Engineering, 27*, pp. 100-104. https://doi.org/10.1515/mspe-2019-0017
22. Narodowy Fundusz Zdrowia (2020, August 08). *Raport Badania Satysfakcji Pacjentów Korzystających z Teleporad u Lekarza Podstawowej Opieki Zdrowotnej w Okresie Epidemii COVID-19,* p. 3. Retrieved from: https://www.gov.pl/web/zdrowie/teleporady---zbior-zasad-i-dobrych-praktyk-dla-lekarzy-poz
23. World Health Organization Eastern Mediterranean Region (2025, March 31). *eHealth. Health topics.* Retrieved from: https://www.emro.who.int/health-topics/ehealth/
24. Zdrojewicz, Z., Witkiewicz, W., Dołowiec, A., Głód, J. (2014). Robotyka w medycynie. *Chirurgia Polska, vol. 16(2),* pp. 84-90. Retrieved from: https://journals.viamedica.pl/chirurgia_polska/article/view/43606