The structuring of digital health within the scope of PHC in Brazil and the production of information for its development

Gustavo Cancela e Penna

Health Technology Center (CETES/FM/UFMG), Minas Gerais, Brazil.
E-mail: gustavocpenna@gmail.com

Rosângela Durso Perillo

Health Technology Center (CETES/FM/UFMG), Minas Gerais, Brazil.
E-mail: rosangeladurso.perillo@gmail.com

Tarcizo Afonso Nunes

Medicine School (UFMG), Minas Gerais, Brazil.
E-mail: tan@medicina.ufmg.br

Mariana Abreu Caporali de Freitas

Reasercher, Telehealth Center of the Medicine School of UFMG, Minas Gerais,Brazil.
E-mail: caporalimariana@gmail.com

Maria do Carmo Barros de Melo

Medicine School (UFMG), Minas Gerais, Brazil.
E-mail: mcbmelo@gmail.com

Rosália Morais Torres

Health Technology Center (CETES/FM/UFMG), Minas Gerais, Brazil.
E-mail: rosaliamoraistorres@gmail.com

Alaneir de Fatima dos Santos

Corresponding author ;
Coordinator, Telehealth Center of the Medicine School of UFMG, Minas Gerais,Brazil. E-mail: laines@uol.com.br.
Https://orcid.org/0000-0002-7674-0449

Abstract

Introduction: Digital health has been advancing at a dizzying speed around the world, especially after the COVID-19 pandemic, with legislation driving its development. *Objective:* This article aims to analyze the development of digital health in the country within the scope of primary health care. *Methodology:* This article was structured considering some steps: (1) literature review; and (2) systematization of the development of digital health in the country. *Results and discussion:* It was evident that for the advancement of PHC in the scope of digital health, it is necessary: knowledge about the technological structure existing in the UBS (Brazilian acronym for Unidade Básica de Saúde - Unified Health System) as well as the quality of the existing connectivity, including aspects of the mobile network; about information related to the effective use of the electronic medical record by the various professional categories and its relationship with the national health data network and with other points of care; and about data related to the effective use of telehealth, types of activities developed and type of telehealth service provider. *Conclusion:* Digital health in Brazil has been incorporated into PHC with the expansion of the technological structure, but there is still a long way to go with the definition of determinants and ongoing evaluation of its implementation.

Keywords: *Digital Health; Primary Health Care (PHC); Service Structure.*

Resumen

Salud Digital en la Atención Primaria de Salud en Brasil.

Introducción: La salud digital ha avanzado en todo el mundo a una velocidad vertiginosa, particularmente después de la pandemia de COVID, con una legislación que está impulsando su desarrollo. *Objetivo:* Este artículo tiene como objetivo analizar el desarrollo de la salud digital en el país en el ámbito de la atención primaria de salud. *Metodología:* Este artículo fue estructurado considerando algunos pasos: (1) revisión de la literatura; (2) sistematización del desarrollo de la salud digital en el país. *Resultados y discusión:* Se evidenció que para el avance de la APS en el ámbito de la salud digital es necesario: conocimiento sobre la estructura tecnológica existente en la UBS así como la calidad de la conectividad existente, incluyendo aspectos de redes móviles; sobre información sobre el uso efectivo de la historia clínica electrónica por parte de las diferentes categorías profesionales y su relación con la red nacional de datos de salud y otros puntos de atención; y sobre datos relacionados con el uso efectivo de la telesalud, tipos de actividades realizadas y tipo de proveedor de servicios de telesalud. *Conclusión:* La Salud Digital en Brasil ha sido incorporada a la APS con una ampliación de la estructura tecnológica, pero aún queda un largo camino por recorrer en la definición de determinantes y evaluación permanente de su implementación.

Palabras-clave *Salud Digital; Atención Primaria de Salud (APS); Estructura de Servicio.*

Resumo

Saúde Digital na Atenção Primária à Saúde no Brasil

Introdução*: A saúde digital tem avançado no mundo com uma velocidade vertiginosa, particularmente após a pandemia de covid, com legislação que são impulsionadoras de seu desenvolvimento. **Objetivo:** Este artigo pretende analisar o desenvolvimento da saúde digital no país no âmbito da atenção primaria à saúde. **Metodologia:** Este artigo foi estruturado considerando algumas etapas: (1) revisão de literatura; (2) sistematização do desenvolvimento da saúde digital no país. **Resultados e discussão**: Evidenciou-se que para o avanço da APS no âmbito da saúde digital, é necessário: conhecimento sobre a estrutura tecnológica existente nas UBS assim como a qualidade da conectividade existente, incluindo aspectos de rede móvel; sobre informações relativas à utilização efetiva do prontuário eletrônico pelas diversas categorias profissionais e sua relação com a rede nacional de dados em saúde e com outros pontos de atenção; e sobre dados relativos à utilização efetiva de telessaúde, tipos de atividades desenvolvidas e tipo de prestador de serviços de telessaúde. **Conclusão:** A Saúde digital no Brasil tem sido incorporada à APS com ampliação da estrutura tecnológica, mas ainda há um grande caminho a ser trilhado com a definição de determinantes e avaliação permanente de sua implementação.*

Palavras-chave: *Saúde digita; APS; Estrutura de serviço.*

INTRODUCTION

Digital transformation has influenced several dimensions of health services such as how care is provided, diagnoses are made, tests are performed, and decisions are made. This phenomenon also represents a cultural change, as it defines new roles for professionals and users[1]. According to the WHO, digital health will be valued and adopted if it is accessible and supports equitable and universal access to quality health services; it increases the efficiency and sustainability of health systems in providing quality, accessible, and equitable care; and it strengthens and intensifies health promotion, disease prevention, diagnosis, management, rehabilitation, and palliative care, in a system that respects the privacy and security of patient health information[2].

Since 2005, the World Health Assembly, through its resolution on eHealth, has urged Member States to "consider the need to develop a long-term strategic plan to develop and implement eHealth Services (…) to develop the infrastructure of information and communication technologies for health (…) to promote equitable, affordable and universal access to its benefits"[3]. More than 120 WHO Member States have developed a national health policy or strategy.

In 2023, the Global Initiative on Digital Health was launched by WHO at the G20 Summit of Health Ministers. It is a WHO-led network of stakeholders organized to facilitate the implementation of the Global Strategy on Digital Health 2020-2025 and other WHO norms and standards for Digital Health System Transformation[4].

In this context, there has been a significant development of digital health worldwide, particularly after the Covid-19 pandemic. A review study on digital health in 2024 highlights that a well-functioning digital ecosystem – with adaptable and interoperable digital tools, robust information and communication technology foundations, and enabling environments – is essential for the success of eHealth interventions. Facilities with better digital literacy, motivated staff, and adequate funding have demonstrated greater adoption of eHealth technologies, leading to improved and coordinated service delivery and greater patient satisfaction. However, the potential of eHealth is often constrained by existing sociocultural norms, geographical inequalities in access to technology, and, disparities in digital literacy[5]. A study[6] using meta-analysis highlights three fundamental elements for the incorporation of Information and Communication Technologies (ICT) resources in Primary Health Care (PHC), capable of establishing a solid foundation on which to build better quality, more resilient, and more equitable health systems: 1) clinical workflows must support the delivery of care both in person and via the Internet; 2) the integration of asynchronous care delivery must be organized as it is a critical component; and 3) planning for the future means planning for everyone, including those with potentially limited access to health care due to technological and communication barriers.

A systematic review of telehealth resource use for chronic patients in primary care during the COVID-19 pandemic[7] concluded that synchronous telemedicine was highly effective in ensuring continuity of care and treatment, providing patients with convenience, improved access to treatment, and earlier disease management. Videoconferencing and telephone consultations were the most used methods. Challenges included concerns about patient privacy, technological literacy, and acceptance. Telemedicine was highlighted for its ability to provide immediate access to medical advice and eliminate the need for long-distance travel, contributing to increased patient adherence. Synchronous telemedicine is a promising solution for the management of chronic conditions during and after the COVID-19 pandemic, offering benefits to both patients and healthcare professionals. To maximize its potential, concerns regarding patient privacy, confidentiality, and technological literacy need to be addressed. Appropriate legislation and regulations are necessary for the long-term success of telemedicine, making it a valuable component of healthcare systems.

A study in the United Kingdom[8] showed that participants with higher levels of education had significantly higher satisfaction with remote consultations than participants with secondary-level qualifications. These findings can inform the use and adaptation of remote consultations in primary care. Adults with lower levels of education may require additional support to improve their experience and ensure equitable care through remote consultations. In Spain, user satisfaction with teleconsultations was also found[9].

Brazil has a long history of incorporating digital health resources into its healthcare structure, particularly in PHC. This article aims to analyze the development of digital health in the country within the scope of primary health care.

METHOD

This article was structured considering some steps. Initially, we carried out a literature review considering the development of digital health actions in Brazil, in the period 2015-2024, in the main indexed databases (Medline, Lilacs, Redalyc, Scopus, Pubmed), in Portuguese, English, and Spanish.

Soon after, a review of the main regulatory frameworks for digital health in Brazil was carried out, through the analysis of laws, ordinances, decrees, and resolutions using the same period, in the database on legislation within the scope of the SUS (Brazilian acronym for Sistema Único de Saúde-Unified Health System), structured within the scope of the Ministry of Health.

Then, we carried out a systematization of the development of digital health in the country, including reflections on what would be the most relevant information that primary care could make available to contribute to the development of digital health. This information was categorized into three large blocks: IT and internet structure in Basic Health Units; Electronic medical records and Telehealth. The literature allowed us to situate how these three dimensions of digital health are in PHC in the country.

RESULTS AND DISCUSSION

Thirty-seven articles were found that focus on the reality of implementing digital health in Brazil and several resolutions, laws, and decrees that discuss this process. Based on this material, it was possible to highlight the process of developing digital health in Brazil in PHC.

In Brazil, the development of digital health strategies has already come a long way. The country launched its digital health strategy in 2015, called the National Policy for Information and Informatics in Health, where from the beginning the priority was the incorporation of ICT in primary care[10]. CIT Resolution number 19, of June 22, 2017, approved and made public the document E-Health Strategy for Brazil, which proposes a vision of e-Health and describes mechanisms to contribute to its incorporation into the SUS by 2020[11].

This Resolution emphasizes that the e-health strategy aimed to increase the quality and expand access to health care to qualify health teams, streamline care, and improve the flow of information to support health decision-making, including clinical decisions on health surveillance, regulation, health promotion, and management decisions. According to this resolution, e-Health should contribute to achieving the health objectives defined by the SUS so that the results obtained can be demonstrated and the costs associated with them can be estimated. It explains that the cross-cutting actions presented characterize the essence of the e-Health Vision for Brazil: electronic health records, telehealth, support for mobility, management, and dissemination of knowledge, management of patient flow, management and operation of health units, and integrated management of the SUS.

In 2020, the Digital Health Strategy 2020-2028 was launched, describing the set of activities to be carried out and the resources needed to implement the Digital Health Vision, associated with evolutionary stages, and highlighting which monitoring activities should be structured. Once again, PHC is prioritized[12].

It is assumed that digital health can radically change health outcomes if supported by sufficient resources, investment in governance, institutional and workforce capacity to enable digital systems changes, and training in data use, planning, and management. With this essential investment in people and processes, in line with national strategies that set a vision for the digitalization of the health sector, digital health can improve the efficiency and cost-effectiveness of care.

Brazil has recently taken significant steps towards digital health. In 2023, the Secretariat for Information and Digital Health was created, with the role of supporting the Secretariats of the Ministry of Health, managers, workers, and users in the planning, use, and incorporation of information and information and communication technology products and services – ICT (telehealth, ICT infrastructure, software development, interoperability, data integration and protection and information dissemination)[13].

In 2024, the SUS digital Program was established, aimed at promoting digital transformation within the Unified Health System - SUS to expand the population's access to its actions and services, with a view to comprehensive and resolvable health care[14].

The program will in practice allow financing for municipal and state health departments covering interoperable information systems, electronic health data records, application of data science, artificial intelligence, telemedicine, telehealth, mobile health applications, wearable devices, applied robotics, personalized medicine, and the internet of things, aimed at the health sector.

The digital health program has the following specific objectives: to promote the appropriate, ethical and critical use of new digital technologies in the SUS; to support the proposal of collaborative and free digital solutions that improve the provision of services, the management of care by health professionals and the quality of health care; to encourage training and ongoing education in digital health; to promote awareness, consciousness and engagement in the use of digital technologies and the appropriate treatment of data by SUS actors, fostering digital literacy and the culture of digital health and the protection of personal data; to increase digital maturity in the SUS; to strengthen social participation and the role of citizens in the creation of innovative digital solutions in the health field; to strengthen the digital health ecosystem in the SUS; to contribute to the development of a collaborative environment for improving the management of the SUS, through digital transformation; to promote the interoperability of health data; and to reduce inequity in access to digital health solutions and services in the different regions of the country[14].

The guidelines of the SUS Digital program are: universality and equity in access to digital health products and services, at all levels of health care; citizen protagonism in decisions about digital health products and services, understanding their needs and offering value through high-quality, simple, agile and personalized services, with attention to the user

experience; recognition of the National Health Data Network - RNDS (*Rede Nacional de Dados em Saúde*) as the digital platform for interoperability, innovation, information and health services for all of Brazil, for the benefit of citizens, users, communities, managers, professionals, workers and health organizations; induction of interoperability of health information systems; encouragement of democratic and participatory management; active transparency in the provision of data and information that enable monitoring and society's participation in the social control of digital health services and policies, with cooperation between federated entities; use of information and communication technologies to support the decentralization of health activities, observing regional and local specificities; recognition of access to quality internet as essential to promoting digital inclusion and reducing inequalities in access to information and communication technologies necessary for the implementation of digital health; ensuring the safe use of information, observing the rules on the protection of personal data provided for in the legislation; combining financial, technological and material resources from the Union, states, Federal District and municipalities for the digital transformation of the SUS; prioritizing the inclusion of digital health in the training and continuing education in health of SUS health professionals and workers; and associating the digital health actions of the SUS Digital Program with the SUS health care model, to guide their achievement[14].

The SUS Digital Program will be developed in three stages: I - planning (states, the Federal District and municipalities may express interest in preparing Digital Health Transformation Action Plans - PA Digital Health, based on a situational diagnosis); II - implementation of digital health transformation actions; and III: evaluation.

The first planning stage was regulated by ordinance 3233, covering the following phases: I - situational diagnosis of the territory, observing the health macro-region to which the Plan refers; II - establishment of the degree of digital maturity based on the application of the National Digital Health Maturity Index – INMSD (*Rede Nacional de Dados em Saúde)*; and III - analysis of the situational diagnosis of the territory and the recommendations resulting from the application of the INMSD[14] is currently in full execution.

The national digital maturity index will be composed of the following components: Management and governance in digital health; Training and development; Interoperability systems and platforms; Telehealth and digital services; Infostructure; Monitoring, evaluation, and dissemination of strategic information; and Infrastructure and security.

Considering this perspective on digital health in Brazil and its development, understanding the process of incorporating digital health resources into PHC in Brazil is essential for its development. Several strategies and instruments have been identified for the development of digital health[15,16]. The instrument of the PHC CENSUS/2024, which is being prepared by the Ministry of Health and the ABRASCO PHC research network, with the participation of Conass and

Conasems, includes several significant aspects to understand the process of incorporating actions linked to digital health: information technology equipment and internet access; digital equipment aimed at care, use of electronic medical records (e-SUS APS and others) and telehealth (teleconsultations, telediagnosis, second formative opinion)[17].

The connectivity situation of Basic Health Units has already advanced significantly in Brazil, a fundamental step towards the consistent structuring of digital health actions. It has been observed that, over time, there has been an improvement in the allocation of resources linked to ICT, but in 2019, there were still 25.5% of units without internet access and 10.5% of UBS did not have any computers – an improvement compared to 2012 when 49.5% of units had this reality[18]. Data collected by CETIC in 2021 states that 92% of UBS were already connected to the internet in the country[19].

The perspective of having the entire healthcare structure of the SUS equipped with ICT resources implies structuring quality internet access and the existence of a computer structure in all offices, as well as in the reception, pharmacy, meeting room, and ACS. As we move towards offering mobile ICT services, which enable patients to access healthcare services and receive care in a more agile way, the ICT infrastructure must include the presence of institutional tablets and smartphones. In many places and countries, during the COVID-19 pandemic, it was the professionals' devices that were used, but we need the public sector to move forward with the perspective of institutionalizing this infrastructure[20].

Regarding electronic medical records, there is consensus in the literature about their benefits, allowing for improvements in the speed and quality of care processes. In Brazil, regarding the number of Family Health Teams and Primary Care Teams that use electronic medical records, the 4th Monitoring and Evaluation Report of the Digital Health Strategy for Brazil 2020-2028[21] states that of the 57,089 existing in Brazil, 48,838 were computerized, corresponding to 85.5% of the Family Health Teams at the end of 2022. Knowing the effective extent of the implementation of electronic medical records, by professional categories and functionalities, will enable planning the next steps for the implementation of the digital health policy.

Improving the possibilities of providing health information to citizens, the National Health Data Network (RNDS) is implemented in the country, which aims to exchange information between health establishments at various points in the Health Care Network, allowing the continuity and transition of care in health services. By establishing the RNDS as a national platform focused on the integration and interoperability of health information between public and private health establishments and health management bodies of the federative entities, the RNDS aims to guarantee access to health information, necessary for the continuity and transition of care for citizens.

The availability of this data to citizens has advanced, and in 2024, "*Meu SUS Digital*" was launched, which is the current official application of the Ministry of Health and the gateway to access the services of the Unified

Health System (SUS) in digital form. It allows citizens to monitor their clinical history and access digital solutions to be the protagonist of their health, having been an evolution of Conecte SUS, foreseen in the digital health strategies for structuring the national health data network[22].

Among the features available in the RNDS, we can highlight information on vaccines, exams, available health networks, allergies, records of hospitalizations, laboratory tests for detecting COVID-19, and medications given by the Popular Pharmacy Program and self-declared medications. As for the Health Network, through the application, citizens can also identify health establishments near their location, opening hours, and services offered, as well as make online appointments for Primary Care services at UBS that use eSUS PHC.

This process is still in its early stages, with the number of UBSs fully connected to the national data network increasing from 1,945 to 3,116, corresponding to 6.57% of the country's UBSs in 2022. As for data from the laboratory network involving COVID-19, a total of more than 61 million COVID-19 test results were made available by December 2022, through public and private health service networks, connected to the RNDS through 72 different information systems. As for the registration of immunobiological applications, in addition to the records of immunobiological against COVID-19, the RNDS has more than 211 million records of routine vaccinations. It is important that basic health units move towards making information available to their citizens, as well as so that we can have, within the scope of the SUS, information on users at any point in the care network[21].

Brazil faces a major challenge in structuring healthcare networks, with PHC acting as the coordinator of care for patients who pass through this network. The structuring and provision of clinical information are essential for this coordination process to occur.[23] Therefore, it is essential that the ESF have information on what is happening at other levels of complexity in the healthcare system. In this sense, in addition to the strategy of making data available via RNDS, it is also important to know whether PHC electronic medical records are available at other points of care.

In PHC, the development of telehealth actions, which were structured as a strategy to improve health systems, became crucial during the COVID-19 pandemic in the management, care, monitoring, control, combat, prevention, and dissemination of information and knowledge to the community, patients and professionals involved[24]. Telehealth enabled the assessment of the patient's progress during COVID-19; early detection of complications; and knowledge and treatment of comorbidities that could increase the risk of hospitalization. Two systematic reviews on TH and COVID-19 in this area[25,26] state that the studies find an increase in the use of TH resources.

Since then, its development has been significant. It has been found that teleconsultation in primary care services is considered clinically appropriate and can influence the expansion of access and speed of care. Telehealth services in PHC can also increase access in places with a shortage of specialized consultations, through teleconsultations[27].

Another study[28] assesses the process of structuring PHC in Europe and the use of telemedicine, stating that Struture Telehealth (ST) is an alternative. In general, the widespread adoption of ST in PHC appears to be more a question of work organization and health financing, rather than technology and ethics. Also, in Australia[29] a study on Telehealth (TH) and PHC states that COVID-19 has transformed Austra lian primary care with the rapid adaptation of digital technologies to complement "face-to-face" primary care with TH.

However, despite this rapid expansion of Health Technology (HT) resources, the continuity of its use and the different aspects that constitute barriers to its expansion are being deepened. A study[30] in the United States showed that the COVID-19 pandemic produced immediate and far-reaching effects on the health system. Initially, there was a 300-fold increase in TH visits over 1 month from March 15 to April 14, 2020, accounting for almost 70% of total medical consultations. However, after the pandemic, recent reports reveal that the use of TH has fallen significantly, down to 21% of total medical consultations, and continues to decline, requiring actions that can perpetuate its use within the scope of PHC.

Some studies claim that telehealth resources achieve significant results in PHC: in the care of hypertensive and diabetic patients[31,32], in patients with depression and dementia[33], in the care of women and children[34]. A study in the United Kingdom revealed that patients are satisfied with the incorporation of telehealth resources into care practice[8].

To deal with the COVID-19 pandemic in Brazil, the regulatory framework of the professions was changed, allowing the possibility of teleconsultations. A survey conducted by the ABRASCO Primary Health Care Network found that 14.5% of professionals reported having used online consultations with their patients, 16% sent prescriptions online, and 42.8% used WhatsApp. In addition, several initiatives related to teleeducation activities to deal with COVID-19 were carried out by telehealth centers. Therefore, during the pandemic, Primary Health Care in Brazil experienced significant use of telehealth resources[35].

Currently, telehealth actions at the national level have been restructured. Regarding the implementation of telehealth centers in the country, there has been progress in recovering a situation of telehealth development that the country had already achieved: in 2022, there were 10 centers in operation (there were 23 in 2016) and by the end of 2023, there were 24 centers in operation again. They offer the following activities in telediagnosis: teleECG, teleretinography, and teledermatology[36]. Studies in Brazil also highlight a progressive use of telehealth resources in Brazilian PHC[37,38].

Therefore, knowing how telehealth resources are used in PHC, their different types of structuring, the incorporation of digital devices for telediagnosis, and the structuring of service provision are significant for advancing the structuring of digital health.

Finally, a recent systematic review[39] systematizes recommendations for the integration of eHealth in primary care:

1. When determining the appropriate type of technology to be used in a specific situation, assess the situation and the people involved (patients and caregivers) to determine their perceptions,

expectations, concerns, attitudes, and motives related to the technology.

2. Consider technology-related factors (type of care delivery modality, technology design) and person-related factors (patient and provider perceptions of the technology) together during technology design and implementation to achieve a good person-technology fit.

3. Consider using communication systems such as telehealth when the patient and provider have a pre-established relationship.
1.

4. Train providers in the use of technology, in developing technology-specific communication skills, and in adapting existing communication skills for technology-mediated interactions to facilitate rapport and trust-building with patients and other team members.

5. Consider how technology is likely to impact rapport and trust-building differently across different patient sociodemographic groups when designing and implementing technology. Use communication systems such as telehealth judiciously and be mindful of patient preferences for technology use, especially in the case of language barriers and with patients with visual, auditory, and cognitive-behavioral challenges.

Therefore, digital health interventions improve health in several ways, supporting people in managing their health and well-being, enabling caregivers to adhere to guidelines and deliver high-quality care, and improving supply chains and workforce management. Digital health opens new possibilities for the delivery of quality and equitable health services. It is essential to understand in detail through PHC information how digital health is developing in Primary Health Care Units. Its incorporation is strategic for public health systems based on PHC.

This study provided a comprehensive overview of the digital health development process in PHC, highlighting its latest developments and identifying the necessary information that can support the advancement of digital health activities in PHC. However, some limiting aspects were identified: the lack of reliable, continuously updated information on how digital health activities develop in the reality of Brazilian PHC, which means that reflections on its development may be overestimated; the identification of information that would be relevant for the development of digital health is still very basic; and finally, the complexity of the topic means that different dimensions are not covered in the scope of the information identified.

CONCLUSION:

The development of digital health in primary care in Brazil is ongoing, with PHC being prioritized in the various legal documents related to e-health plans in the country. The technological structure has advanced, as has the implementation of electronic medical records. Telehealth actions have suffered a setback in recent years but are recovering.

As for the information that would be important for the advancement of PHC in digital health, there is knowledge about the technological structure and connectivity of UBS; information regarding the effective use of electronic medical records; and data regarding the use of telehealth resources, types of activities developed, and type of telehealth service provider. Despite the advances in digital health in Brazil, there is still a long way to go.

REFERENCES

1. Meskó B, Drobni Z, Bényei É, Gergely B, Győrffy Z. Digital health is a cultural transformation of traditional healthcare. Mhealth. 2017 Sep 14; 3:38. DOI: 10.21037/mhealth.2017.08.07.

2. World Health Organization. Global strategy on digital health 2020-2025. Geneva: 2021. Licença: CC BY-NC-SA 3.0 IGO.

3. World Health Organization (WHO). Resolution WHA 58.28 on eHealth [Internet]. Genebra: WHO; 2005. Disponível em: http://www.who.int/healthacademy/media/WHA58-28-en.pdf.

4. World Health Organization (WHO). Global initiative on digital health: executive summary [Internet]. July 31, 2023. Disponível em: https://cdn.who.int/media/docs/default-source/digital-health-documents/global-initiative-on-digital-health_executive-summary-31072023.pdf?sfvrsn=5282e32f_1.

5. Erku D, Khatri R, Endalamaw A, Wolka E, Nigatu F, Zewdie A, et al. Digital Health Interventions to Improve Access to and Quality of Primary Health Care Services: A Scoping Review. Int J Environ Res Public Health. 2023 Sep 28;20(19):5674. DOI: 10.3390/ijerph20196854

6. Jeong Y, Crowell T, Devon-Sand A, Sakata T, Sattler A, Shah S, et al. Building Pandemic-Resilient Primary Care Systems: Lessons Learned From COVID-19. J Med Internet Res. 2024 Feb 23;26:e47667. DOI: 10.2196/47667.

7. Ahmed A, Mutahar M, Daghrery A, Albar N, Alhadidi I, Asiri A, et al. A Systematic Review of Publications on Perceptions and Management of Chronic Medical Conditions Using Telemedicine Remote Consultations by Primary Healthcare Professionals April 2020 to December 2021 During the COVID-19 Pandemic. Med Sci Monit. 2024 Feb 11;30:e943383. DOI: 10.12659/MSM.943383.

8. Lifford KJ, Grozeva D, Cannings-John R, Quinn-Scoggins H, Moriarty Y, Gjini A, et al. Satisfaction with remote consultations in primary care during COVID-19: a population survey of UK adults. Br J Gen Pract. 2024 Jan 25;74(739):e96-e103. DOI:10.3399/BJGP.2023.0092

9. Iguacel I, Antón I, Urcola F, Ariño M, Martínez-Jarreta B. Assessing patient satisfaction with telephone-based consultations before, during and after the COVID-19 pandemic in Spain. Aten Primaria. 2024;56(2):102792.

10. Ministério da Saúde (Brasil). Portaria nº 589/GM/MS, de 20 de maio de 2015. Institui a Política Nacional de Informação e Informática em Saúde (PNIIS) [Internet]. Brasília: Ministério da Saúde; 2015. Disponível em: https://bvsms.saude.gov.br/bvs/saudelegis/gm/2017/MatrizesConsolidacao/comum/13152.html.

11. Ministério da Saúde (Brasil). Resolução CIT nº 19, de 22 de junho de 2017. Aprova e torna público o documento Estratégia e-Saúde para o Brasil, que propõe uma visão de e-Saúde e descreve mecanismos contributivos para sua incorporação ao Sistema Único de Saúde (SUS) até 2020. Brasília: Ministério da Saúde; 2017. Disponível em: https://www.conass.org.br/resolucoes-cit/

12. Ministério da Saúde (Brasil). Secretaria-Executiva. Departamento de Informática do SUS. Estratégia de Saúde Digital para o Brasil 2020-2028 [Internet]. Brasília: Ministério da Saúde; 2020. 128 p. Disponível em: http://bvsms.saude.gov.br/bvs/publicacoes/estrategia_saude_digital_Brasil.pdf. ISBN 978-85-334-2841-6

13. Ministério da Saúde (Brasil). Decreto 11358, de 1º de janeiro de 2023. Aprova a Estrutura Regimental e o Quadro Demonstrativo dos Cargos em Comissão e das Funções de Confiança do Ministério da Saúde e remaneja cargos em comissão e funções de confiança [Internet]. Brasília: Ministério da Saúde; 2023. Disponível em: https://www.gov.br/saude/pt-

14. br/composicao/sgtes/mnnpsus/legislacao/decreto-11-358-de-1ºjaneiro2023/view#:~:text=Aprova%20a%20Estrutura%20Regimental%20e,em%20comissão%20efunções%20de%20confiança.

15. Ministério da Saúde (Brasil). Portaria GM/MS nº 3.232, de 1º de março de 2024. Institui o programa SUS digital [Internet]. Brasília: Ministério da Saúde; 2024. Disponível em: https://www.in.gov.br/web/dou/-/portaria-gm-ms-n-3.232-de-1-de-marco-de-2024-546278935.

16. Cho LD, Rabinowitz G, Goytia C, Andreadis K, Huang HH, Benda NC, et al. Development of a novel instrument to characterize telemedicine programs in primary care. BMC Health Serv Res. 2023 Nov 17;23(1):1274.

17. Organização Mundial da Saúde (OMS). Acompanhamento da implementação da saúde digital: Uma visão geral das metodologias nacionais e internacionais selecionadas. Genebra: OMS; 2022.

18. Ministério da Saúde (Brasil). Oficina preparatória do Censo Nacional sobre Unidades Básicas de Saúde e avaliação da APS [Internet]. 2023. Disponível em: https://www.gov.br/saude/pt-br/assuntos/noticias/2023/setembro/oficina-discute-censo-nacional-das-unidades-basicas-de-saude-e-avaliacao-da-atencao-primaria-a-saude.

19. Dos Santos AF. Uma visão do processo de incorporação de tecnologias na rede primária de atenção à saúde no Brasil. Rev Latinoam Telesalud. 2019; 6:112-125. ISSN: 2175_2990.

20. Regional Center for Studies on the Development of the Information Society (CETIC). 2020 Annual Report Cetic [Internet]. Brasil, São Paulo; CETIC.br, 2020. 76 p. Disponível em:

https://www.cetic.br/media/docs/publicacoes/9/20210531120833/Annual_Report_Cetic2020.pdf

21. Garfan S, Alamoodi AH, Zaidan BB, Al-Zobbi M, Hamid RA, Alwan JK, et al. Telehealth utilization during the Covid-19 pandemic: A systematic review. Comput Biol Med. 2021 Nov; 138:104878. doi: 10.1016/j.compbiomed.2021.104878. Epub 2021 Sep 20. PMID: 34592585; PMCID: PMC8450049.

22. Ministério da Saúde (Brasil). Secretaria-Executiva. Departamento de Informática do SUS. 4º Relatório de Monitoramento e Avaliação da Estratégia de Saúde Digital para o Brasil 2020-2028 [Internet]. Brasília: Ministério da Saúde; 2023. 83 p.: il. Disponível em: http://bvsms.saude.gov.br/bvs/publicacoes/relatorio_monitoramento_estrategia_saude_digital.pdf. ISBN 978-65-5993-017-3.

23. Ministério da Saúde (Brasil). Meu SUS Digital [aplicativo móvel]. Versão mais recente. Google Play Store. Disponível em: https://play.google.com/store/apps/details?id=br.gov.datasus.cnsdigital&hl=pt_BR&gl=US.

24. McDonald K, Schultz E, Albin E, Pineda N, Lonhart J, Sundaram V, et al. (orgs.). Care Coordination Measures Atlas. 4th ed. Rockville, MD: Agency for Healthcare Research and Quality; 2014.

25. Krist AH, DeVoe JE, Cheng A, Ehrlich T, Jones SM. Redesigning Primary Care to Address the COVID-19 Pandemic in the Midst of the Pandemic. Ann Fam Med. 2020 Jul;18(4):349-354. doi: 10.1370/afm.2557

26. De Guzman KR, Snoswell CL, Caffery LJ, Smith AC. Economic evaluations of videoconference and telephone consultations in primary care: A systematic review [Internet]. Journal of Telemedicine and Telecare. 2024;30(1):3-17. doi:10.1177/1357633X211043380. Disponível em: https://journals.sagepub.com/doi/abs/10.1177/1357633X211043380

27. Doraiswamy S, Abraham A, Mamtani R, Cheema S. Use of Telehealth During the COVID-19 Pandemic: Scoping Review. J Med Internet Res. 2020 Dec 1;22(12):e24087. doi: 10.2196/24087. PMID: 33147166; PMCID: PMC7710390.

28. Leyton C, Zhang C, Rikin S. Evaluation of the Effects of the COVID-19 Pandemic on Electronic Consultation Use in Primary Care [Internet]. Telemed J E Health. 2022;28(1):66-72. doi:10.1089/tmj.2020.0547. Disponível em: https://pubmed.ncbi.nlm.nih.gov/33794114/

29. Garattini L, Badinella Martini M, Mannucci PM. Improving primary care in Europe beyond COVID-19: from telemedicine to organizational reforms. Intern Emerg Med. 2021 Mar;16(2):255-258. doi: 10.1007/s11739-020-02559-x. Epub 2020 Nov 16. PMID: 33196973; PMCID: PMC7668282.

30. Jonnagaddala J, Godinho MA, Liaw ST. From telehealth to virtual primary care in Australia? A Rapid scoping review. Int J Med Inform. 2021 Jul;151:104470. doi: 10.1016/j.ijmedinf.2021.104470. Epub 2021 Apr 22. PMID: 34000481.

31. Patel SY, Mehrotra A, Huskamp HA, Uscher-Pines L, Ganguli I, Barnett ML. Trends in Outpatient Care Delivery and Telemedicine During the COVID-19 Pandemic in the US. JAMA Intern Med. 2021;181(3):388–391. doi:10.1001/jamainternmed.2020.5928.

32. Fuster-Casanovas A, Miró CQ, Vidal-Alaball J, Escalé-Besa A, Carrión C. eHealth in the Management of Depressive Episodes in Catalonia's Primary Care From 2017 to 2022: Retrospective Observational Study. JMIR Ment Health. 2024 Jan 18;11:e52816.

33. Idris H, Nugraheni WP, Rachmawat T, Kusnali A, Yuliant A, Purwatiningsih Y, et al. How Is Tele-health Currently Being Utilized to Help in Hypertension Management within Primary Healthcare Settings? A Scoping Review. Int J Environ Res Public Health. 2024 Jan 12;21(1).

34. Cross AJ, Mohanannair GG, Parker M, Baker AL, Bonevski B, Godbee K, et al. A novel, multidomain, primary care nurse-led and mHealth-assisted intervention for dementia risk reduction in middle-aged adults (HAPPI MIND): study protocol for a cluster randomised controlled trial. BMJ Open. 2023 Dec;13(12):e073709.

35. Loezar-Hernández M, Briones-Vozmediano E, Gea-Sánchez M, Robledo-Martin J, Otero-García L. Percepciones de matronas de Atención Primaria sobre el uso de la telemedicina durante la pandemia COVID-19 en España / Primary health care midwives' perceptions on the use of telemedicine during the COVID-19 pandemic in Spain. Enferm. clín. (Ed. impr.). 2023 Nov-Dec;33(6):380-390.

36. Bousquat A, Giovanella L, Facchini L, Mendonça MHM, Nedel FB, Cury G, et al. The Brazilian primary health care response to the COVID-19 pandemic: individual and collective approaches. Front Public Health. 2023.

37. Ministério da Saúde (Brasil). Secretaria de Informação e Saúde Digital. Encontro Saúde Digital – Noções Gerais e Normas Legais [vídeo]. 2024. Disponível em: https://www.youtube.com/watch?v=h3ehT9MSzBA.

38. Dos Santos AF, Machado ATM, Bousquat A, Fausto M, Cury G, Abreu DX. Relatório técnico. Infraestrutura da Atenção Primária à Saúde em municípios brasileiros e municípios rurais remotos: caracterização das condições físicas, assistenciais e de incorporação de tecnologias de informação. Brasil, Belo Horizonte. 2021.

39. Bender JD, Facchini LA, Lapão LMV, Tomasi E, Thumé E. The use of Information and Communication Technologies in Primary Health Care in Brazil - the period of 2014 to 2018. Cien Saude Colet [periódico]. 2024 Jan;29(1):e19882022.

39. Ramachandran M, Brinton C, Wiljer D, Upshur R, Gray CS. The impact of eHealth on relationships and trust in primary care: a review of reviews. BMC Prim Care. 2023 Nov 3;24(1):228.