Telehealth in Curitiba: A Success Story

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Abstract

This article describes the beginning of the use of Telehealth in the city of Curitiba in 2009 up to the creation of the Telehealth Center in 2024.**Objective:** To report the history of the use of different Telehealth modalities (teleconsulting, telediagnosis, teletriage, telecare, teleconsultation, and telemonitoring) in Curitiba and their outcomes.**Methods**: This is a descriptive study that reports the implementation of the different Telehealth modalities in Curitiba until the establishment of the Telehealth Center.**Results:** The demonstration of existing data on the use of telehealth, in a safe and efficient manner, shows improvements in access, equity, and comprehensive care for the population, serving as an example to support other municipalities. The use of tele-regulation/teleconsultation (TR/TC) to define the priority of referrals, rather than following a simple chronological order, allows the identification of the severity of the patient's clinical condition, indicating the most appropriate location, optimizing SUS resources and patients' time.**Conclusion:** Telehealth is a transformative agent in health services, especially in Primary Health Care (PHC), and has potential for expansion into other SUS services such as urgent and emergency care.

Key-words: Telemedicine; Telehealth; Teleconsultation; Telediagnosis; Digital health; Information technology.

Resumen

Telesalud en Curitiba: Una historia de éxito

Este artículo describe el inicio del uso de la Telesalud en el municipio de Curitiba, en 2009, hasta la creación del Núcleo de Telesalud en 2024.**Objetivo:** Relatar la historia del uso de las diferentes modalidades de Telesalud (teleconsultoría, telediagnóstico, teletriaje, teleatención, teleconsulta y telemonitoreo) en Curitiba y sus resultados.**Métodos:** Se trata de un estudio descriptivo que relata la implantación de las diferentes modalidades de Telesalud en Curitiba hasta la creación del Núcleo de Telesalud.**Resultados**: La demostración de los datos existentes sobre el uso de la telesalud, de manera segura y eficiente, evidencia la mejora en el acceso, la equidad y el cuidado integral de la población, sirviendo de ejemplo para apoyar a otros municipios. El uso de la telerregulación/teleconsultoría (TR/TC) para definir la prioridad de los encaminamientos, evitando el simple orden cronológico, permite identificar la gravedad de la condición clínica del paciente, indicando el lugar más adecuado, optimizando los recursos del SUS y el tiempo de los pacientes.**Conclusión:** La telesalud es un agente transformador en los servicios de salud, principalmente en la Atención Primaria (APS), y tiene posibilidades de expansión en otros servicios del SUS como la urgencia y la emergencia.

Palabras clave: Telemedicina; Telesalud; Teleconsulta; Telediagnóstico; Salud digital; Tecnología de la información.

Resumo

Telessaúde em Curitiba: Uma história de sucesso

Este artigo descreve o início da utilização da Telessaúde no município de Curitiba no ano de 2009 até a criação do Núcleo de Telessaúde em 2024. **Objetivo**: Relatar o histórico da utilização das diferentes modalidades da Telessaúde (teleconsultoria, telediagnóstico, teletriagem, teleatendimento, teleconsulta e telemonitoramento) no município de Curitiba e seus resultados**. Métodos**: Trata-se de estudo descritivo que relata a implantação das diferentes modalidades da Telessaúde em Curitiba até a criação do Núcleo de Telessaúde. **Resultados:** A demonstração dos dados existentes da utilização da telessaúde, de forma segura e eficiente, evidencia a melhoria do acesso, equidade e cuidado integral da população, servindo de exemplo para apoiar outros municípios. A utilização da telerregulação/teleconsultoria (TR/TC) para a definição da prioridade dos encaminhamentos, não ocorrendo pela simples ordem cronológica, pode identificar a gravidade da condição clínica do paciente, indicando o local mais adequado, otimizando recursos do SUS e tempo dos pacientes. **Conclusão**: A telessaúde é um agente transformador nos serviços de saúde, principalmente na Atenção Primária (APS), e tem possibilidades de avanço em outros serviços do SUS como a urgência e emergência.

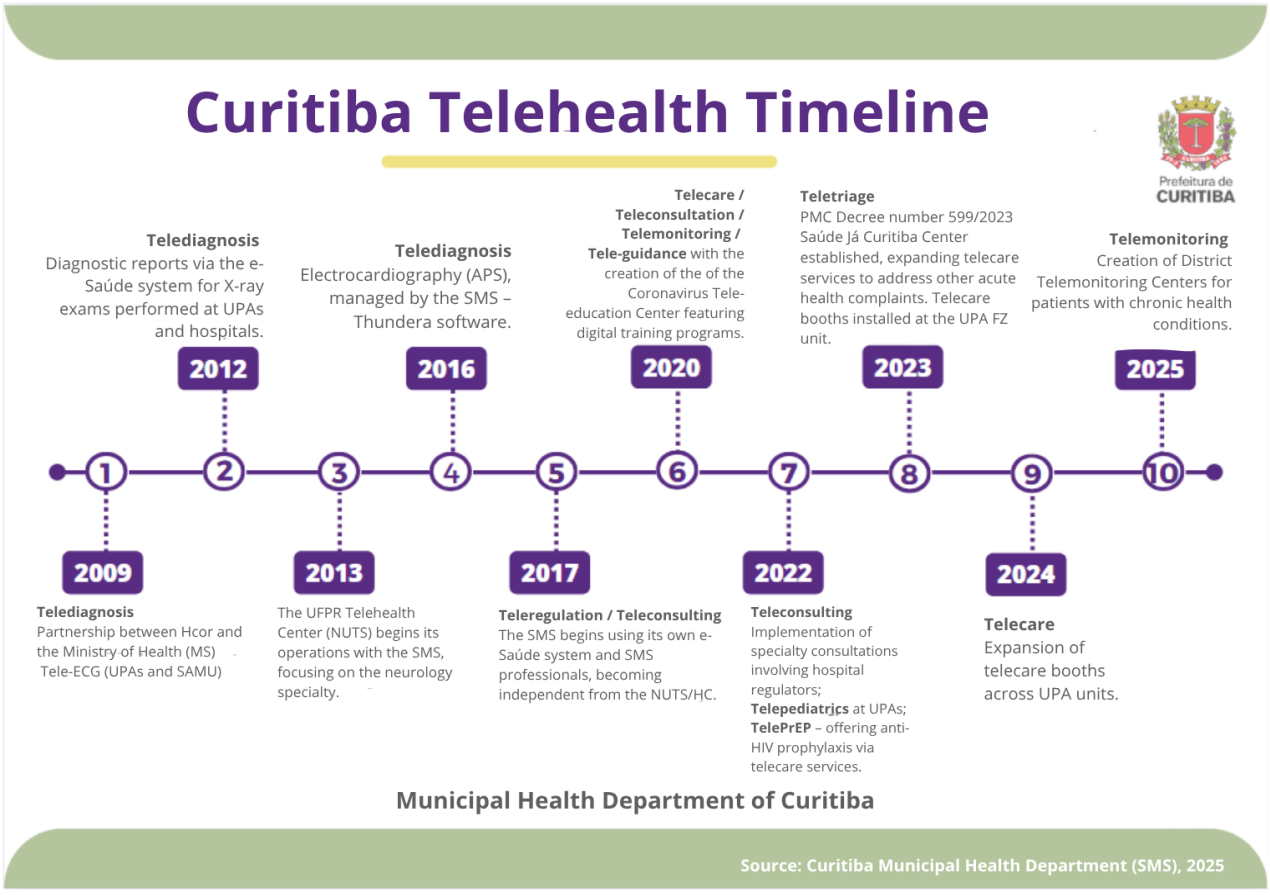
Palabras-chave: Telemedicina, Telessaúde, Teleconsulta, telediagnóstico, saúde digital, tecnologia de informação.

INTRODUCTION

Curitiba is widely recognized as a global example of a smart, innovative city, distinguished by its ongoing investment in technological solutions that facilitate public access to government services[1] .Within the scope of the Municipal Health Secretariat (SMS-Secretaria Municipal da Saúde), the integration of technologies is systematic, underpinned by a robust information ecosystem initiated by the implementation of the first municipal electronic health record system, E-Saúde, in 1999[2]. This system has been established as the foundation for the digitalization of public health, enabling integration across different levels of care and national platforms.

Among the most widely used Information and Communication Technologies (ICTs) in the municipality, telehealth stands out as a tool that enables the remote delivery of health services via the internet, voice, and video, expanding the population's access to specialized care[3]. The timeline of telehealth in Curitiba, depicted in Figure 01, highlights its evolution: in 2009, telediagnosis (TD) was launched with the issuance of electrocardiogram reports at Emergency Care Units (UPAs), subsequently expanding in 2012 to include radiographs.

Figure 01 – Curitiba Telehealth Timeline



Source: Quadros, 2025[4]

At the national level, starting in 2006, the Ministry of Health identified various initiatives involving telemedicine and telehealth[5], culminating in the creation of the National Telehealth Brazil Networks Program (PNTBR-Programa Nacional Telessaúde Brasil Redes) in 2007, which interconnected administrators, educational institutions, and SUS services[6]. In Curitiba, telerregulation and teleconsulting services in neurology were implemented in 2013 in partnership with the Federal University of Paraná (UFPR), although difficulties regarding platform integration limited their continuity.

Other modalities have been incorporated over the years. The Central Saúde Já (CSJ), established in 2020 in response to the COVID-19 pandemic, evolved in 2022 to serve patients presenting with mild acute complaints[7]. In 2025, 10 District Telemonitoring Centers were implemented, focused on the management of chronic conditions such as diabetes, hypertension, and mental health. Since 2024, teleconsultation in pediatrics has been available at Emergency Care Units (UPAs), supporting professionals in providing care to children and complemented by the installation of telehealth booths for mild cases[8].

Therefore, Curitiba has established a consistent trajectory of innovation in digital health, aligned with national guidelines and local needs. This article aims to report on the implementation of telehealth services in the municipality, analyze their results, and discuss how these initiatives have contributed to expanding the population's access to healthcare services.

METHODOLGY

This study is characterized as a descriptive investigation aimed at documenting the implementation process of various telehealth modalities in Curitiba, from their beginning to the establishment of the Telehealth Center. To construct this analysis, data were drawn from official documents issued by the Curitiba Municipal Health Secretariat and the Ministry of Health, which record and describe the evolution of telehealth practices within the municipality. Furthermore, quantitative data regarding the volume of services provided across the various modalities were incorporated. These data are compiled and analyzed by the Telehealth Center and disseminated periodically, ensuring the transparency and reliability of the information.

The demographic and structural context of the municipality was established using official data from the Brazilian Institute of Geography and Statistics (IBGE), which estimated Curitiba's population at approximately 1.83 million inhabitants in 2025[9]. The city maintains its own network of health services, comprising 109 Basic Health Units, 53 of which adhere to the Family Health Strategy while 56 are traditional units, as well as 9 Emergency Care Units, 13 Psychosocial Care Centers, 5 Specialized Units, 3 Dental Specialty Centers, 2 municipal hospitals, 1 Psychiatric Stabilization Unit, 1 Municipal Clinical Analysis Laboratory, 1 Vaccine Center, 1 Urgency and Emergency Regulation Complex, 1 Zoonoses Control Center, 1 Saúde Já Service Center, and 1 Tele-regulation/Teleconsulting Center[8]. This network is complemented by contracts with private providers of specialized clinics, hospitals, and diagnostic and therapeutic support services, expanding the system's service capacity and problem-solving effectiveness.

Technological infrastructure plays a central role in this process. The municipal electronic health record called E-Saúde, implemented in 1999 and used across all care centers, constitutes the foundation for the integration of clinical and administrative information[2]. Also, the Saúde Já application, launched in 2017, facilitated greater interaction between the population and health services, fostering the expansion of telehealth modalities[7]. In 2024, the Telehealth Hub was established, though not yet officially accredited by the Ministry of Health, integrating virtual services such as the TR/TC Center, the Saúde Já Center, and the District Telemonitoring Centers dedicated to monitoring patients with chronic conditions. It is this system that provides access to the data utilized in this research.

Thus, the adopted methodology integrates documentary data, quantitative records, and demographic information, enabling a comprehensive and contextualized analysis of the implementation of Telehealth in Curitiba. The triangulation of these sources brings greater robustness to the study, while simultaneously demonstrating how the combination of a structured care network and advanced technological resources contributed to the consolidation of digital health within the municipality.

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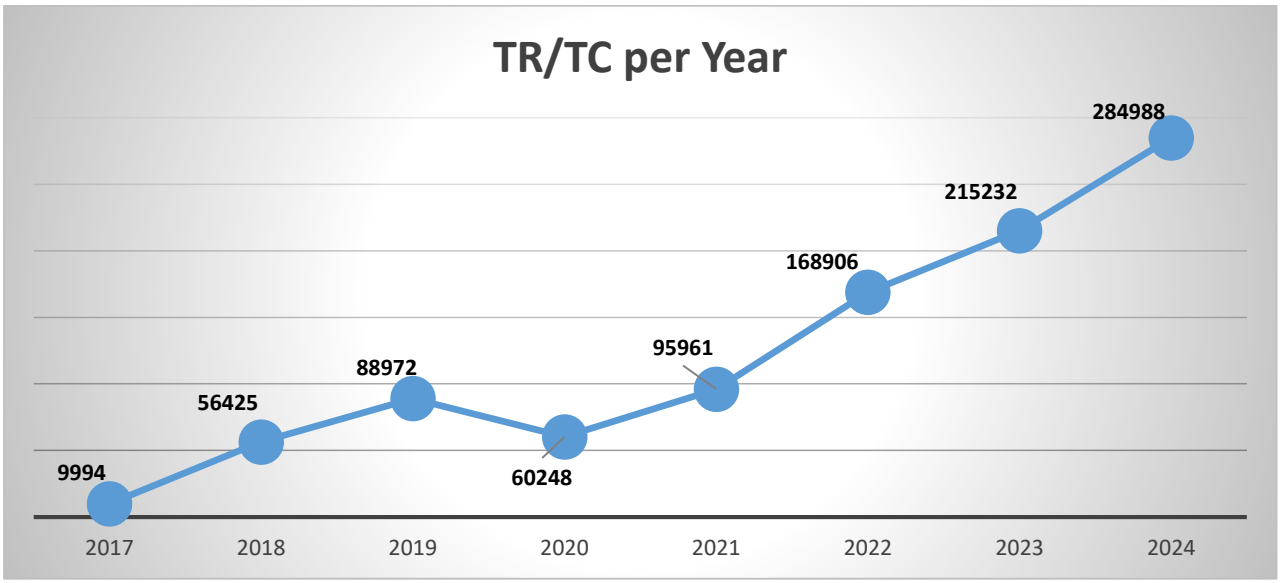
RESULTS

Currently, Telehealth is firmly established as a fundamental strategy within the healthcare initiatives of the municipality of Curitiba. Below are the results obtained from the historical data series for each implemented modality.

Teleregulation / Teleconsulting

All records are stored in E-Saúde, ensuring traceability and transparency. The computerized system generates quantitative reports that allow for the measurement of variables such as the number of patients evaluated, the number of responsible professionals, and response time. Since 2016, the Center has also performed telediagnosis of ECG exams from UBS. Currently, the TR/TC covers 39 specialties and exams, having experienced continuous growth since its inception; Graph 01 illustrates this year-over-year growth.

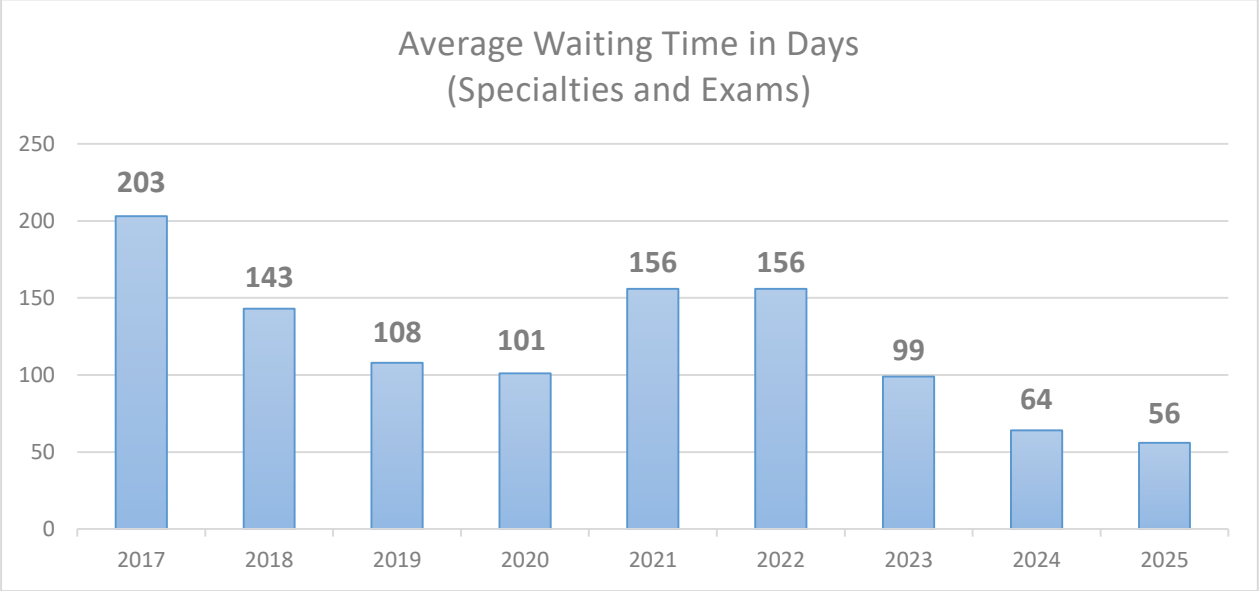
Figure 01 – Historical Series of Tele-regulations / Teleconsultations at the Curitiba SMS



Source: SMS- E saúde (2025)

Teleregulation is a strategy capable of improving and enhancing patient access to specialized services, supported by a computerized system[8]. The average waiting time for scheduling specialized consultations and exams decreased from 203 days in 2017 to 56 days in 2025. In March 2025, 82% of referrals were scheduled within 90 days, and 66% within 30 days, demonstrating a significant impact on the quality of access, as illustrated in Graph 02.

Figure 02 – Historical Series of Tele-regulations / Teleconsultations at the Curitiba SMS



Source: Municipal Health Department – E-Health (March 2025)

Telediagnosis

Since 2016, 580,000 remote ECG reports have been issued for exams performed at the UBS. In 2024, the monthly average stood at 7,200 reported exams. Radiology reports, issued since 2012 by a central unit affiliated with the municipal hospital, are also recorded directly in the E-Saúde system. Currently, an average of 27,000 radiology exams are performed per month, covering both elective care and urgent and emergency cases.

Telecare, Tele-triage, and Teleconsultation

The Telecare service, initially focused on guidance regarding COVID-19, made Curitiba the first Brazilian state capital to offer video consultations. Following an expansion in November 2021, the call center began providing administrative guidance as well as scheduling services for medical exams and vaccinations. In April 2023, the service evolved into a Virtual Urgent Care model, using the Manchester Triage System adapted for telehealth (9). Between April 2023 and March 2025, the Saúde Já Center recorded 782,892 answered calls, 253,720 teletriages, and 276,229 medical teleconsultations completed via telephone or video. Most of the complaints (91%) were deemed eligible for remote care, achieving an average resolution rate of 82.6%. Respiratory and gastrointestinal symptoms demonstrated even higher resolution rates, 87% and 91%, respectively. User evaluations, conducted via the Saúde Já mobile app, had an average rating of 4.5 on a scale of 1 to 5. Furthermore, 972 remote nursing consultations focused on breastfeeding were conducted, alongside 12,793 virtual consultations related to HIV pre-exposure prophylaxis (PrEP), resulting in the home delivery of 1,172 medication kits.

The data reinforce the strategic role of the Central as a new entry point to the SUS in Curitiba, combining expanded access, agility, clinical safety, and user satisfaction. The facility also provides remote nursing consultations focused on breastfeeding guidance, a service that has already handled 972 cases, and on HIV pre-exposure prophylaxis (PrEP), which, since 2022, has conducted 12,793 virtual consultations and delivered 1,172 medication shipments directly to patients' homes.

Telemonitoring

District Centers for the Telemonitoring of Patients with Chronic Conditions are being implemented in 2025, initially covering four of Curitiba's ten Health Districts, with a focus on care pathways for Arterial Hypertension and Mental Health. For each participating district, a reference UBS was selected, serving as the hub from which the telemonitoring operations are structured. Each Center is staffed by a team consisting of a physician and a nurse, who work in close integration with the professionals at the local UBS. This strategy is supported by digital dashboards

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developed based on the municipal protocol for longitudinal care. These dashboards function as a clinical alert system, flagging, for instance, patients with expired prescriptions (red), those with prescriptions expiring within 60 days (yellow), or those with outdated diagnostic tests. Based on this information, the Center's nurse conducts proactive telephone outreach to guide patients on updating their tests and to organize the care workflow at the UBS. On the scheduled day, the patient follows a specific care circuit, tailored to their specific needs, which may include: collection of laboratory samples, an electrocardiogram, and the measurement of anthropometric data; patients also receive materials for home blood pressure monitoring, when needed. Five days after the sample collection, a follow-up virtual assessment is conducted with the physician. If the clinical parameters fall within the normal range, the prescription is renewed and sent to the user via the Saúde Já mobile application. Should the need arise, an in-person consultation with the UBS physician is scheduled. The entire process is recorded in the patient's electronic health record.

In just one month, the District Telemonitoring Centers referred 130 users for in-person care at the UBS. These individuals were reintegrated into the longitudinal care pathway based on an analysis of data dashboards and proactive outreach by the team. The use of data also enabled the refinement of the registered user base, allowing for the removal of patients who had passed away, who no longer lived in Curitiba, or who received follow-up care exclusively within the private healthcare network. Furthermore, it was possible to re-stratify patient risks, directing them toward appropriate follow-up care based on this new stratification.

Telehealth in UPAs

Emergency Care Units have incorporated two telehealth modalities. Telepediatrics, launched in 2022 at three UPAs with support from the Hospital Pequeno Príncipe, expanded to all units in 2024, resulting in the evaluation of 1,826 children. This modality fostered greater local problem-solving capacity and optimized therapeutic resources. In 2023, teleconsultation booths were installed, enabling patients with minor complaints to access the Saúde Já Call Center directly from the UPAs. Since then, 19,276 patients have been assisted via these booths, achieving an average resolution rate of 81%.

The analysis of the results demonstrates that Curitiba has consolidated Telehealth as a foundational strategy for improving access to and the quality of health care, reducing wait times, enhancing clinical resolution, and strengthening integration among the different levels of care.

DISCUSSION AND CONCLUSION

Brazilian health services have historically faced the challenge of expanding timely access to specialized consultations and organizing care pathways that ensure greater efficiency and equity. In this context, Curitiba's experience with telehealth demonstrates that the systematic incorporation of digital technologies can be a powerful strategy for enhancing the quality of care and reducing barriers to access. As discussed by Haddad (2025, p. 11), TR/TC represents a tool capable of reorganizing primary care by improving the quality of referrals, strengthening the continuing education of health professionals, and increasing clinical problem-solving capacity. The reduction in the average waiting time for specialized consultations, from 203 days in 2017 to 56 days in 2025, provides concrete evidence of efficiency gains and demonstrates the impact of telehealth on waiting list management.

Teleconsultation for mild acute conditions, conducted through the Central Saúde Já, was established as a new model for accessing the SUS. This modality combines technology, patient-centered care, and clinical effectiveness, reorganizing the healthcare network without disrupting the bond with the patient. Integration with the Saúde Já mobile app and the use of qualified digital signatures bolster legal security and compliance with the General Data Protection Law (LGPD), while simultaneously enhancing convenience for users. Resolution rates exceeding 80% and high levels of patient satisfaction confirm the service's efficacy, aligning with the evidence presented in the reference article, which highlights telehealth as a sustainable and transformative strategy for the SUS.

The implementation of District Telemonitoring Centers reaffirms the role of Primary Health Care (PHC) as the organizer of care and the integrator of the health network. The use of structured digital dashboards enabled the identification of users outside their designated care pathways and facilitated timely interventions, enhancing the quality of longitudinal follow-up. This experience reinforces the perspective that the future of PHC depends on a combination of territorial bonding, the intelligent use of technology, and follow-up centered on individual needs, as highlighted by Haddad, 2025[11], who underscores

the qualitative gains in efficiency and cost-effectiveness afforded by telehealth.

In the UPAs, telepediatrics and teleconsultation booths represent innovations that enhance local problem-solving capacity and optimize resources. However, challenges persist regarding current legislation, which does not yet recognize telehealth as a formal mode of care within these services. Furthermore, the interpretation of referrals made via remote consultation may raise questions regarding the problem-solving capacity of APS, even though these do not necessarily constitute referrals for in-person visits, but rather remote clinical support.

Limiting factors of this study include the possibility of data loss regarding the initial implementation of telehealth modalities, particularly during periods when records were not systematized or integrated into the electronic health record system. This limitation may impact a comprehensive longitudinal analysis of the evolution of these services.

On the other hand, the contributions of this article are significant, as they present, in an integrated manner, the various telehealth modalities implemented in Curitiba, describing their implementation timelines, evolution, and data consistency. This approach enables an understanding of how telehealth became established as a permanent strategy, rather than merely emergency, and how various organizational arrangements were incorporated in a coordinated fashion into the municipal health system.

The experience in Curitiba demonstrates that telehealth was established as a permanent strategy for care management. The results presented highlight significant gains in access, efficiency, and problem-solving capacity, as well as increased user satisfaction. In an international comparison, the average waiting time for specialist consultations in Curitiba (56 days in 2025) is lower than in major health systems, such as Rio de Janeiro (75 days) [12], Canada (102 days) [13], and the United Kingdom (99 days) (14), reinforcing the potential of telehealth as a tool for reorganizing the healthcare network.

Despite the advances, challenges persist, such as the need for regulatory alignment, the full integration of records, and the consolidation of telehealth as a foundational national policy. The experience in Curitiba, aligned with current thinking on telehealth, confirms that the intelligent use of technology, combined with the strengthening of Primary Health Care, can transform the SUS into a more responsive, efficient, equitable, and sustainable system. The continuation of this process requires systematic data monitoring, active listening to users, and the constant refinement of practices, ensuring that telehealth remains a strategic pillar for the future of the SUS.

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