Telemedicine in Italy's Inner Areas: Between Constitutional Promises and Challenges*

Bukurie Ozuni**

Abstract:
The digitalisation of services, most notably in healthcare through the development and implementation of telemedicine, is transforming service delivery in Italy's inner areas. While this technological change offers new opportunities to address different barriers these areas face, it also raises complex questions regarding the fulfilment of constitutional obligations regarding equity and accessibility to healthcare services. This paper examines the intersection of digitalisation, legal frameworks, and the digital divide, focusing on telemedicine's potential to reduce or deepen healthcare access disparities.
When strongly supported by digital infrastructure and connectivity, telemedicine can improve healthcare service delivery in rural and mountainous territories. Therefore, offering remote consul-

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** Dottoranda e assegnista di ricerca nell'Università di Genova, Early-Stage Researcher at CLOE Project, bukurie.ozuni@edu.unige.it.

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tation, diagnostics, and monitoring to residents in these areas enhances access and continuity of care. However, the benefits of this advanced technology are not distributed uniformly across the country. Furthermore, the digital divide is characterised by inequalities in broadband access, digital literacy, and technology affordability and remains a paramount challenge for telemedicine.
Without focused attempts to address these inequities, telemedicine risks replicating present patterns of exclusion, favouring those with digital skills and access.
Legally, the Italian state has a fundamental responsibility to ensure equal access to healthcare for all, as stipulated in Article 32 of the Italian Republic's Constitution and enshrined in the international human rights framework. Moreover, the development of telemedicine requires a reassessment of this obligation.
In conclusion, integrating telemedicine into health systems in inner areas presents significant promises and challenges. While digital health tools can increase efficiency and access, their success depends on a technologically advanced and socially based policy framework. Bridging the digital divide and reaffirming the right to health as a universal guarantee are essential steps towards building a more inclusive and resilient health system for all citizens, regardless of their geographical origin.

1. Introduction

In an accelerated era where demography, economy, and technology are changing rapidly, the Italian healthcare system faces increasing pressure to ensure equitable access to care across different territorial contexts. Among the most affected are the "*inner areas*", characterised by demographic decline, low service density, and geographical and infrastructural isolation[1]. These territories, which comprise almost 60% of the Italian territory but only a fraction of its population, cannot guarantee their residents the constitutional right to health, as enshrined in Article 32 of the Italian Constitution. In addition, Article 3 of the Constitution declares that all citizens have equal social dignity and are equal before the law. Therefore, the state is committed to removing economic and social barriers that impede equality. The Constitution stipulates that the right to healthcare must be guaranteed equally to all and reinforces the obligation to receive universal, non-discriminatory care.
In this context, telemedicine, providing medical services through digital and remote technologies, has emerged as a potential lever for promoting territorial cohesion and social justice. Recognised by national and European strategies, including the National Recovery and Resilience Plan (*PNRR*), the National Strategy for Inner Territories (*SNAI*), and the European Strategy for Digital Health, telemedicine is presented, in a progressive way, not only as a tool for innovation but also to combat territorial inequalities[2]. However, the implementation of telemedicine in Italy's inner areas remains uneven. These problems are

[1] F. Barca, P. Casavola, & S. Lucatelli, *Strategia nazionale per le aree interne: Definizione, obiettivi, strumenti e governance*, Ministero dell'Economia e delle Finanze - DPS, Materiali UVAL, Issue 31, Rome, 2014, pp. 7-14, 20.

[2] Presidenza del Consiglio dei Ministri, *Piano Nazionale di Ripresa e Resilienza (PNRR)*, 2021, p. 227; European Commission, *Digital Health and Care Strategy*, 2021, p. 4.

often caused by infrastructure shortcomings, digital illiteracy, fragmented governance, and a care culture traditionally rooted in personal relationships with trusted local doctors.
Furthermore, telemedicine has traditionally been viewed as a technical innovation in providing healthcare services, and this article argues that telemedicine should be transformed from a technical tool into a constitutional mechanism for achieving territorial justice in the context of Italy's underserved areas. In other words, telemedicine is not considered a convenience or efficiency issue here but a vehicle for fulfilling the Italian Constitution's mandate for equal access to healthcare in all territories, reducing the gap between urban centres and remote communities. This approach defines digital health services as tools for realising fundamental rights, particularly the right to health, and preserving regional equity, thereby positioning telemedicine as a cornerstone of territorial justice rather than a peripheral technical solution.
The article is divided into five main sections. The first session reviews the actual legal and regulatory framework guiding telemedicine in Italy, including recent national eHealth guidelines and regional initiatives, to establish the legal and policy context for the implementation of telemedicine in the inner areas. In the second session, the benefits of telemedicine for remote communities are analysed, highlighting improvements in access to healthcare, continuity of services, and cost-effectiveness of health service delivery. Third, challenges compromising the implementation of telemedicine in the inner areas are discussed, such as infrastructural limitations, digital and literacy gaps, data privacy issues, administrative or regulatory barriers and linguistic barriers.
By critically analysing telemedicine's possibilities and structural limitations, the article considers it an instrument of constitutional significance rather than a simple digital innovation. It argues that telemedicine can only become an effective tool for reducing territorial inequalities and protecting the right to health in the Italian inner areas through holistic reforms.

2. Concepts and Definitions

Telemedicine and telehealth represent fundamental innovations in healthcare delivery, particularly in areas with limited resources and geographically isolated. Telemedicine is "the use of telecommunications and information technology to deliver a wide range of health information and services to underserved populations", including clinical and non-clinical applications such as education and administration[3]. In contrast, the Institute of Medicine proposed a more focused definition of telemedicine in 1996: "the use of electronic infor-

[3] W. J. Grigsby, *Telehealth: An Assessment of Growth and Distribution*, in *The Journal of Rural Health*, vol. 18, no. 2, Spring 2002, pp. 348-349, *https://doi.org/10.1111/j.1748-0361.2002.tb00896.x*.

mation and communication to provide and support health care when distance separates participants", emphasising direct patient care[4]. While these key definitions are derived from the American context, they are highly relevant to Italy's "inner areas" (*aree interne*), a concept formalised by the SNAI, a policy launched in 2012 to reverse the demographic decline and territorial marginalisation[5]. SNAI classifies inner areas as municipalities that are significantly distant from vital service centres, particularly those that require more than 20 minutes by car to reach "*service hubs*" providing secondary education (at least one secondary school), healthcare (a hospital with an emergency department) and mobility (a train station with regional or national connections). Moreover, these areas are characterised by significant demographic ageing, with individuals aged 65 and over constituting more than 30% of the population in some inner areas, such as Liguria and Emilia-Romagna, as of 2011, compared to a national average of approximately 20.8% in the same year, which rose to 23% by 2021. In addition, these territories face persistent infrastructure shortages relative to national standards, further deepening their marginalisation and limiting access to essential services[6].

As the SNAI emphasises, Italy's inner areas face significant challenges in accessing healthcare. Furthermore, these challenges derive partially from the reorganisation of the national hospital network, which focuses on large urban centres, often leading to the closure or downgrading of small, local facilities. This centralisation has increased the time it takes for patients living in inner areas to travel, creating significant challenges in accessing healthcare.

The PNRR has acknowledged these disparities and has promoted, based on proximity, a new territorial healthcare model. This model has been further articulated in Ministerial Decree 77/2022, redefining the territorial assistance standards. It operationalises the creation of Community Health Houses (*Case della Comunità*), Territorial Operations Centers (*Centrali Operative Territoriali*), and Community Hospitals (*Ospedali di Comunità*) as pil-

[4] Institute of Medicine, *Telemedicine: A Guide to Assessing Telecommunications in Health Care*, National Academies Press, Washington, DC, 1996, p. 25.

[5] F. Barca, P. Casavola & S. Lucatelli, *Strategia nazionale per le aree interne: Definizione, obiettivi, strumenti e governance*, Ministero dell'Economia e delle Finanze - DPS, Materiali UVAL, Issue 31, Rome, 2014, pp. 7-4, 20.

[6] Travel times, calculated using road network data and average speeds, classify these areas into three levels: "intermediate" (20 - 40 minutes), "peripheral" (40 -75 minutes), and "ultraperipheral" (more than 75 minutes), distinguishing them from "ring areas." (less than 20 minutes) and urban centres. Covering 60% of Italy's territory (approximately 180,000 square kilometres), the inner areas comprise 4,261 municipalities, or 52% of Italy's total of 7,904, and are home to 22% of the population, or approximately 13.5 million people, according to 2022.
Starting with the 2014-2020 SNAI cycle, 72 specific inner areas, comprising 1077 municipalities with a population of approximately 2 million, were selected as project areas. In the 2021- 2027 cycle, the number of project areas has been expanded to 124, covering 1,904 municipalities and 4.57 million residents, reflecting updated strategies and funding allocations. F. Barca, P. Casavola, & S. Lucatelli, *Strategia nazionale per le aree interne: Definizione, obiettivi, strumenti e governance*, Ministero dell'Economia e delle Finanze - DPS, Materiali UVAL, Issue 31, Rome, 2014, pp. 23-28; Agenzia Per La Coesione Territoriale, Strategia Nazionale per le Aree Interne, Agenzia per la Coesione Territoriale, Rome, 2014.; ISTAT, *La demografia delle aree interne: dinamiche recenti e prospettive future*, Rome, 2024, *https://www.istat.it/wp-content/uploads/2024/07/STATISTICA-FOCUS-DEMOGRAFIA-DELLE-AREE-INTERNE_26_07.pdf.*

lars of integrated care[7]. This approach aims to reduce input delays, specifically for older individuals and those with chronic illnesses, promoting equity for the right to health.
Nevertheless, even after this promotion from PNRR, the disparities in accessing these services in these areas remain the same. Although precise statistics on the number of doctors per capita are unavailable, the strategy explicitly promotes telemedicine and integrated territorial care as essential instruments to bridge the gap between urban and rural healthcare[8].
The demographic structure of Italy's inner areas reveals a pronounced ageing trend that aggravates territorial disparities in healthcare access[9]. This concentration of older people also puts significant pressure on the already limited healthcare infrastructure. Furthermore, this underscores the fundamental importance of telemedicine as a strategic tool to ensure equitable healthcare delivery. Telemedicine is a solution for marginalised areas, as it offers remote monitoring, consultation and continuity of healthcare[10]. Within the mandate of the National Health System (*NHS*) to promote universal health coverage, as enshrined in Article 32 of the Constitution, a clear conceptual understanding of telemedicine, telecare, and the definition of inner areas is essential. These definitions establish a common analytical framework and provide the necessary basis for evaluating the implementation and impact of telemedicine in inner areas of Italy[11].

3. Promises of Telemedicine in Italy's Inner Areas

Telemedicine is an innovative approach to healthcare that has important implications for rural and mountainous areas of Italy. Notably, these regions face persistent structural problems that undermine equal access to healthcare[12]. Furthermore, almost one-fifth of older people in rural communities lack access to a health facility within a 30-minute drive. Additionally, shortages are not isolated anomalies but reflect inequalities resulting from ge-

[7] Ministero della Salute, *Decreto Ministeriale 23 maggio 2022, n. 77: Regolamento recante la definizione di modelli e standard per lo sviluppo dell'assistenza territoriale nel Servizio sanitario nazionale*, Gazzetta Ufficiale Serie Generale n. 144, 22 giugno 2022, pp. 1-59.

[8] F. Barca, P. Casavola & S. Lucatelli, *Strategia nazionale per le aree interne: Definizione, obiettivi, strumenti e governance*, Ministero dell'Economia e delle Finanze - DPS, Materiali UVAL, Issue 31, Rome, 2014, pp. 34-38.

[9] According to ISTAT, as of early 2022, approximately 23-24% of the Italian population was aged 65 and over, with projections indicating a steady increase in coming years. This demographic trend is even more pronounced in particular central and northern regions, where the proportion of older residents is slightly above the national average, reflecting Italy's broader challenge of an ageing population and its implications for healthcare and social services. ISTAT, *Demographic Indicators – Year 2022*, April 2023, p. 3,*https://www.istat.it/wp-content/uploads/2023/04/indicatori-2022-english.pdf,*

[10] F. Barca, P. Casavola & S. Lucatelli, *Strategia nazionale per le aree interne: Definizione, obiettivi, strumenti e governance*, Ministero dell'Economia e delle Finanze - DPS, Materiali UVAL, Issue 31, Rome, 2014, pp. 29.

[11] Costituzione Della Repubblica Italiana, art. 32, Gazzetta Ufficiale, December 27, 1947.

[12] F. Barca, P. Casavola & S. Lucatelli, *Strategia nazionale per le aree interne: Definizione, obiettivi, strumenti e governance*, Ministero dell'Economia e delle Finanze - DPS, Materiali UVAL, Issue 31, Rome, 2014, pp. 45-47.

ographic isolation, an ageing population, and underinvestment in health infrastructure. To add to this, the disproportionate burden placed on older people in these areas, combined with health spending below the national average and poor basic care quality, undermines the constitutional guarantee of universal and equal access to healthcare[13]. Without targeted policies to address these systemic imbalances, such as through integrated infrastructure, decentralised models of care, and investment in telemedicine, Italy risks maintaining a territorially fragmented health system that fails to meet the needs of its most marginalised communities[14]. As a healthcare delivery model and a strategic instrument, telemedicine's advantages in addressing systemic inequalities, aligning with Italy's constitutional commitment to health as a fundamental right, as enshrined in Article 32, are undeniable[15].

3.1. Improving accessibility to health services

Underserved territories and dispersed populations have historically interfered with timely healthcare delivery[16]. Moreover, a persistent geographical imbalance characterises Italy's healthcare workforce distribution. Therefore, the geographic imbalances continue to shape the distribution of the health workforce in Italy, reflecting broader territorial inequalities in the provision of public services. According to the *Relazione sullo stato sanitario del paese 2017-2021*, the national average of physicians employed permanently in the NHS is 1.8 per 1,000 inhabitants. However, this average hides notable regional disparities between inner and southern regions. This issue is highlighted by the report, which presents both quantitative and qualitative findings, noting the *"elevata variabilità regionale"* in healthcare personnel density and its impact on territorial equity. These gaps are further deepened by ongoing demographic trends, including population ageing and youth out-

[13] The findings of the Global Burden of Disease 2021 Italy analysis document substantial regional disparities in health outcomes and healthcare service quality. The report highlights that regions with older population structures, such as Liguria and Molise, experience a disproportionate burden of non-fatal diseases and disability. It further notes that underfunding of public health services, shortages of physicians, long waiting lists, and limited availability of primary care and preventive services are prevalent, particularly in southern and inner areas. While the report does not explicitly frame these disparities as constitutional violations, the combined effect of demographic vulnerability and systemic underinvestment effectively undermines the principle of universal and equal access to healthcare guaranteed by Article 32 of the Italian Constitution. See GBD 2021 Italy Subnational Burden of Disease Collaborators, "*State of Health and Inequalities among Italian Regions from 2000 to 2021: A Systematic Analysis Based on the Global Burden of Disease Study 2021*," The Lancet Public Health 10, 2025, pp. e309-e318, *https://doi.org/10.1016/S2468-2667(25)00045-3*.

[14] Moreover, remote areas of Italy, particularly in the rural south, face persistent structural barriers that significantly compromise equal access to healthcare. According to the researchers, regions such as Molise suffer from severe facility shortages. F. Benassi, C. Tomassini, & G. Di Felice, *Spatial Heterogeneities or Inequalities? Health Care Supply and Demand of the Older Population in Italy*, *Applied Spatial Analysis and Policy*, vol. 18, 2025, pp. 1-28, *https://doi.org/10.1007/s12061-025-09647-5*.

[15] Costituzione della Repubblica Italiana, art. 32, Gazzetta Ufficiale, December 27, 1947.

[16] P.H. Guzzi, P. Vizza, G. Tradigo, S. Greco, & P. Veltri, *Design of a Telemedicine Infrastructure for Rural and Remote Areas*, in *Proceedings of the 32nd Symposium on Advanced Database Systems, 2024*, Villasimius, Sardinia, June 23-26, 2024, pp. 1-7.

migration, which increase the healthcare burden while diminishing the local workforce[17]. Such structural imbalances in the distribution of physicians create operational challenges and raise questions about the constitutional principle of equal access to health care.

In this context, telemedicine can be a strategic response to the need for territorial justice rather than just a technological innovation. Besides, by enabling remote consultation, monitoring, and care, telemedicine can bridge the gap between underserved populations and essential health services, especially in rural and mountainous areas where physical proximity to care is limited[18].

Telemedicine eliminates these barriers by facilitating virtual consultations with primary care physicians and specialists and providing direct care to patients in their homes through digital platforms[19]. Furthermore, it will enable continuous monitoring and remote medical advice for chronic diseases, such as cardiovascular disease, diabetes, and respiratory diseases, which are prevalent among the elderly. In addition, demographic data from ISTAT provide a basis for interpreting telemedicine as a technological advancement and a strategic tool for achieving territorial equity and responding to the health needs of Italy's most vulnerable rural population[20].

Therefore, telemedicine is recognised as a strategic solution to overcome structural and geographical barriers to healthcare delivery in the NHS. Moreover, it has been documented that healthcare professionals and managers widely view telemedicine as an important tool for enhancing continuous care, particularly in underserved areas. Furthermore, it reduces patient travel time and logistical burden, reduces missed appointments, and promotes more efficient follow-up and management of chronic diseases. These outcomes are particularly crucial in rural or mountainous areas, where limited health infrastructure, staff shortages, and population vulnerability often impede access to medical care[21]. Despite the apparent potential of telemedicine to address institutional weaknesses in healthcare delivery, particularly during crises such as the COVID-19 pandemic, Italy has failed to cap-

[17] The report shows that Molise and Basilicata consistently fall below national per capita medical staff availability levels. Ministero della Salute, *Relazione sullo stato sanitario del paese 2017-2021*, Ministero della Salute, Rome, 2022, pp. 84, 176, 214-215.

[18] *Ibid*., pp. 176, 214.

[19] This is particularly important for the treatment of chronic diseases such as diabetes, cardiovascular disease, and chronic obstructive pulmonary disease, which affect more than 25% of the elderly. These communities are geographically distant from service centres and often suffer from infrastructural weaknesses, requiring continuous health monitoring in Italy's domestic systems that face traditional challenges. The report highlights that these communities are sparsely populated and are experiencing a decline in younger populations due to outmigration, resulting in an increasingly elderly and care-dependent population. Istat, *Rapporto Annuale 2022: La situazione del Paese*, ISTAT, Rome, 2022, p. 49.

[20] Istat, *La demografia delle aree interne: dinamiche recenti e prospettive future*, Istituto Nazionale di Statistica, Rome, July 29, 2024, pp. 7-9

[21] G. Antonacci *et al.*, *Healthcare Professional and Manager Perceptions on Drivers, Benefits, and Challenges of Telemedicine: Results from a Cross-Sectional Survey in the Italian NHS*, *BMC Health Services Research*, vol. 23, no. 1115, 2023, p. 9.

italise on this opportunity[22]. Implementing supported telemedicine systems in rural and mountainous areas, where patients receive virtual consultations from local health centres, reduces travel and the burden on the health system. Reducing CO2 emissions by approximately 80 metric tons, reducing hospital stays, and contributing to patient well-being[23].
Furthermore, the European Commission sees digital transformation as a foundation for reducing regional inequalities and improving access to healthcare across Member States. In its 2018 report, the Commission identifies telemedicine, mobile health solutions, and cross-border eHealth services as essential tools for improving the quality, efficiency, and continuity of care, especially for rural and remote populations. Additionally, this highlights the importance of strategic investments in broadband infrastructure, interoperable electronic health records, and digital platforms that facilitate effective collaboration between patients and healthcare providers. While the European Commission precedes national initiatives such as the Italian PNRR, it establishes a fundamental policy framework that encourages Member States to pursue digital health reforms aimed at regional equity and system sustainability[24].
Internationally, the World Health Organization (*WHO*) identifies telemedicine as a crucial strategy to address global health disparities, particularly in remote and underserved areas. Furthermore, according to the WHO, telemedicine promotes health equity. It expands access to diagnostic and therapeutic services for low-income people, a strategy successfully adopted in developing and developed countries. This global certainty informs national strategy, such as adapting telemedicine models to suit rural and mountainous areas in Italy. It is a successful and sustainable mechanism for improving regional access to healthcare.

[22] Although the pandemic highlighted the urgency of remote healthcare solutions, Italy lacked a unified national telemedicine strategy, and the implementation of digital tools has been fragmented and inconsistent across regions.
The use of telemedicine in Italy, despite its institutional recognition as a valid tool to improve the quality and accessibility of care, suffers from regulatory uncertainty, fragmented regional implementation, and the lack of a centralized digital health governance system. This fragmentation increases the risk of unequal access to telemedicine services, especially for citizens living in marginalized or disadvantaged areas, thus raising concerns related to the principle of non-discrimination in healthcare delivery. Therefore, the Italian healthcare system missed a vital opportunity to introduce telemedicine in addressing healthcare gaps, especially in rural areas and high-risk areas, such as mountainous regions, where mobility and hospital access are severely limited.
D. Morana, F. Morganti & T. Balduzzi, L*a salute "intelligente": eHealth, consenso informato e principio di non-discriminazione*, in *Federalismi.i*t, n. 34/2022.

[23] Although this study was not conducted in Italy, the findings are particularly relevant for similarly structured and demographically challenged communities such as rural Basilicata, where an ageing population with limited mobility requires a more accessible, community-based digital health model.
M. Moncho-Santonja, S. Aparisi-Navarro, B. Defez García, A. Davol & G. Peris-Fajarnés, Health C*are in Rural Areas: Proposal of a New Telemedicine Program Assisted from the Reference Health Centers, for a Sustainable Digitization and Its Contribution to the Carbon Footprint Reduction*, in *Heliyon*, vol. 8, no. 10, 2022, e09812, pp. 1-10, *https://doi.org/10.1016/j.heliyon.2022.e09812*.

[24] European Commission, *Communication from the Commission on Enabling the Digital Transformation of Health and Care in the Digital Single Market; Empowering Citizens and Building a Healthier Society*, COM (2018) 233 final, European Commission, Brussels, April 25, 2018, *https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52018DC0233*.

By integrating specialists in urban centres with hospitals in rural areas, telemedicine immediately overcomes access gaps.
From this perspective, telemedicine has become a digital convenience and a transformative tool in public health, capable of addressing historical inequalities in access to healthcare. Strategically aligned with national constitutional principles and European policy objectives, it offers a sustainable path to territorial justice, particularly for disadvantaged areas in Italy.

3.2. Savings for patients and the health system

Telemedicine offers significant economic benefits for patients and the INHS, particularly in the country's inner areas[25]. As confirmed by ISTAT, these areas, comprising intermediate, peripheral, and ultra-peripheral municipalities, face barriers to service delivery due to geographical distance and inadequate infrastructure. These disparities make them a prime target for innovative healthcare solutions, including telemedicine, which can reduce access gaps and promote regional equity[26]. Furthermore, telemedicine addresses the infrastructural inequalities that impact these underserved areas by reducing costs, increasing efficiency and redistributing resources to patients and the NHS.
For rural residents, virtual consultations eliminate the high costs of transport, accommodation and lost income associated with face-to-face consultations. Moreover, it is indicated that people residing in rural areas have an average travel time three times longer than those living in central service areas, which is aggravated by the limited public transportation systems available[27]. Thus, this logistical marginalisation imposes both time costs and significant financial burdens, particularly in areas affected by high poverty and depopulation. The structural barriers outlined in SNAI provide a solid foundation for investment in telemedicine and mobile health solutions. These can fill gaps in healthcare delivery by offering services directly to patients' homes or community health centres. In this context, telemedicine is a technological tool and a policy tool for communities, aligning with SNAI's primary goal of restoring equal citizenship by providing equitable access to essential services[28].
Another added value of telemedicine in serving underserved communities is the advancement of artificial intelligence (AI), which transforms mental health care, improves access, and reduces costs. Furthermore, AI-enabled tools, including machine learning algorithms and chatbots, are increasingly recognised as transformative resources in mental health care. These technologies facilitate early and accurate diagnosis of mental health conditions

[25] Istat, *Rapporto Annuale 2022: La Situazione del Paese*, ISTAT, Rome, 2022, pp. 45-47.

[26] Istat, *La demografia delle aree interne: dinamiche recenti e prospettive future*, ISTAT, Rome, July 29, 2024, pp. 2-3.

[27] F. Barca, P. Casavola & S. Lucatelli, *Strategia nazionale per le aree interne: Definizione, obiettivi, strumenti e governance*, Ministero dell'Economia e delle Finanze - DPS, Materiali UVAL, Issue 31, Rome, 2014, pp. 13, 41.

[28] *Ibid.*

through predictive modelling, enable continuous remote monitoring of patients' symptoms and treatment responses, and provide scalable interventions such as AI-powered chatbots offering psychoeducation and cognitive behavioural support. Moreover, by automating diagnostic processes and expanding real-time monitoring capabilities, AI allows clinicians to allocate their time more efficiently to complex cases while ensuring that individuals in remote or underserved areas receive timely assessments and interventions. This integration not only enhances the efficiency of mental health systems but also holds potential to reduce regional disparities and advance the realisation of universal access to mental health services[29]. These efficiencies are further realised through reduced patient travel and overall institutional costs[30].

To reflect and realise these benefits, Italy's PNRR allocates €7 billion to the digital transformation of its healthcare system. Of this total, €1 billion is dedicated to expanding telemedicine services, while €4 billion will strengthen home care provision, addressing the needs of an ageing and often immobile population. The remaining €2 billion is allocated to upgrading the digital infrastructure more broadly, including the development of interoperable electronic health records and the modernisation of health IT systems. These investments reflect a clear strategy to enhance the efficiency and accessibility of healthcare, reduce regional disparities, and uphold the constitutional principle of universal and equal access to health service[31]. Moreover, national policies incorporate telemedicine into their national strategies to deliver services, reduce the cost of hospital readmissions, and promote equitable access to care. Furthermore, Italy's National Telemedicine Platform 2022 initiative aligns with the European Union's vision for digital health, as outlined in the European Commission's 2018 Report on enabling digital transformation in Health and Care[32]. This initiative reflects an institutional shift towards more sustainable and accessible service

[29] This argument builds upon Cruz-Gonzalez et al.'s systematic review, which analysed 85 studies on AI applications in mental health care. The review found that support vector machines and random forest models are widely used for diagnostic purposes, achieving high accuracy in detecting and classifying mental health conditions; machine learning approaches are also utilised for continuous monitoring, enabling remote assessment of patients' progress and treatment responses; and AI-based interventions, including chatbots, provide scalable, adaptable psychological support to diverse populations. The authors conclude that these AI-enabled tools can enhance early detection, optimise treatment planning, and expand access to care for populations with limited service availability. However, they emphasise the need for robust, diverse datasets and greater transparency in algorithmic decision-making to ensure safe and equitable clinical integration. See P. Cruz-Gonzalez, A. W.-J. He, E.P. Lam *et al.*, *Artificial Intelligence in Mental Health Care: A Systematic Review of Diagnosis, Monitoring, and Intervention Applications*, in *Psychological Medicine*, vol. 55, 2025, e18, pp. 1-52.

[30] According to ISTAT, Italian inner areas face significant inequalities in well-being, particularly regarding access to healthcare and transportation services. Residents in these territories frequently report difficulties accessing medical services due to insufficient infrastructure and economic constraints. While exact figures on delayed care due to travel costs are not explicitly provided, the data underscores the structural disadvantages that rural families endure, an issue that telemedicine initiatives could help alleviate by reducing the need for long-distance travel.
Istat, *Equitable and Sustainable Well-being in Italy*, Rome: ISTAT, 2023, pp. 122-125.

[31] Presidenza del Consiglio dei Ministri, *Piano Nazionale di Ripresa e Resilienza (PNRR): Missione 6- Salute*, Governo Italiano, Rome, 2021, pp. 227-231.

[32] European Commission, *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on Enabling the Digital Transformation of Health*

delivery through digital means. While specific cost-saving metrics, such as a 15% reduction in administrative costs, are mentioned in other EU documents, the Commission emphasises that "*efficient revenues*" and "*cost-effective implementation*" are key outcomes of digital health reform[33]. These economic objectives are also closely linked to the EU's broader commitments to improving health services and empowering citizens[34]. Furthermore, globally, the WHO highlights the cost-saving potential of rural telemedicine, a model that Italy is adapting to its unique demographic and geographic challenges[35].

As national and international experience shows, telemedicine is a clinical innovation and a cost-effective strategy to address structural inequalities and improve service delivery in the Italian inner areas. Telemedicine strengthens the NHS's economic sustainability and territorial equity by optimising resource allocation, reducing costs at the patient and system level, and aligning with EU and WHO digital health programmes.

3.3. Improving quality of life and patient empowerment

Telemedicine produces important psychosocial and empowering benefits for its users, extending beyond its clinical role. Within the NHS, telemedicine is a strategic intervention that utilises digital platforms to enhance the quality of life for rural residents and promote patient autonomy. Moreover, telemedicine enhances the psychosocial well-being of residents of remote areas by mitigating the adverse effects of geographical and social isolation, especially among vulnerable groups, such as the elderly and individuals with limited mobility[36]. Furthermore, the ISTAT reports that 40% of inner areas residents over 65 cite mobility limitations as a barrier to care, a challenge disproportionately borne by the 20% who live in single-person households[37].

Although empirical data on psychological outcomes are limited, qualitative evidence suggests that telemedicine can reduce stress and enhance older adults' overall well-being, particularly in underserved areas. According to a qualitative study, healthcare professionals and managers identified reduced patient travel as one of the most cited benefits of

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and Care in the Digital Single Market; Empowering Citizens and Building a Healthier Society, COM (2018) 233 final, European Commission, Brussels, April 25, 2018, pp. 1-2. *https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52018DC0233*.

[33] *Ibid.*, pp. 2-3.

[34] *Ibid.*, pp. 4-6.

[35] World Health Organization, *Telemedicine: Opportunities and Developments in Member States: Report on the Second Global Survey on eHealth*, in *Global Observatory for eHealth Series*, vol. 2, World Health Organization, Geneva, 2010, pp. 6-7, *https://apps.who.int/iris/handle/10665/44497*.

[36] In some areas, where winter precipitation and harsh terrain prevent people from travelling to health facilities 50 to 100 kilometres away, telemedicine offers uninterrupted access to medical care.
Agenzia per la Coesione Territoriale, *Strategia Nazionale per le Aree Interne: Relazione Annuale 2020*, Presidenza del Consiglio dei Ministri, Rome, 2021, p. 22.

[37] Istat, *La demografia delle aree interne: dinamiche recenti e prospettive future*, Istituto Nazionale di Statistica, Rome, July 29, 2024, pp. 26-27.

telemedicine, particularly in rural or mountainous areas with limited infrastructure[38]. The role of telemedicine in improving access to healthcare in marginalised areas assumes constitutional relevance when incorporated into the jurisprudence of the Italian Constitutional Court. Furthermore, in decision no. 509/2000, the Court recognised that the right to health, guaranteed by Article 32 of the Italian Constitution, goes beyond formal access to services, including the fundamental circumstances required to preserve human dignity. The Court emphasised that any regulatory or administrative restriction determining a "*gap of protection*" in situations of urgency and necessity is constitutionally illegitimate since it undermines the "*irreducible core of the right to health*" that must remain inviolable[39]. Moreover, the WHO confirms this, stating that telemedicine can serve as a mechanism to mitigate social exclusion among older rural residents, a phenomenon particularly evident in underpopulated and underserved areas of Italy[40].

Additionally, telemedicine improves patient empowerment by incorporating educational tools that improve health literacy and self-management, which is particularly important in remote areas. The European Commission also emphasises the importance of digital tools in promoting health, disseminating scientific knowledge, and supporting person-centred preventive care. Furthermore, these technologies enhance outcomes for chronic diseases, reduce reliance on acute care, and help patients manage their conditions more effectively, ultimately supporting a more resilient and cost-effective treatment.

From this perspective, telemedicine should be considered not only a clinical and economic asset but also a rights-based tool for enhancing human dignity, autonomy, and social inclusion in underserved areas. Therefore, its strategic implementation in the country marks a paradigm shift in which digital care supports constitutional guarantees and the psychosocial resilience of Italy's most vulnerable areas.

3.4. Improving health equity and regional cohesion

Telemedicine emerges as a transformative mechanism for reallocating healthcare resources and addressing regional disparities in inner areas of Italy. These regions reflect the dif-

[38] G. Antonacci *et al.*, *Healthcare Professional and Manager Perceptions on Drivers, Benefits, and Challenges of Telemedicine: Results from a Cross-Sectional Survey in the Italian NHS*, in *BMC Health Services Research*, vol. 23, no. 1115, 2023, p. 6.
Respondents noted that avoiding long or complicated trips to healthcare facilities improves logistical access, enhances peace of mind, and improves treatment outcomes, particularly among older adults with limited mobility or chronic conditions. Although this study did not report quantitative measures of anxiety reduction, these findings highlight the perceived psychosocial value of telemedicine in reducing barriers that traditionally prevent older adults from receiving timely and consistent care.

[39] Corte Costituzionale, *Sentenza n. 509 del 2000*, November 20, 2000, in *Gazzetta Ufficiale della Repubblica Italiana*, Serie Speciale, no. 43, 2000, *https://giurcost.org/decisioni/2000/0509s-00.html*.

[40] World Health Organization, *Telemedicine: Opportunities and Developments in Member States: Report on the Second Global Survey on eHealth*, Global Observatory for eHealth Series, vol. 2, World Health Organization, Geneva, 2010, p. 12, *https://www.who.int/goe/publications/goe_telemedicine_2010.pdf*.

ferences arising from the decentralised healthcare governance in Italy following the 2001 constitutional reform, as outlined in Article 117 of the Italian Constitution**.**

As Pitino highlights, while decentralisation was intended to enhance subsidiarity, efficiency, and responsiveness to local needs, in practice, it has deepened territorial inequalities. Regions with greater administrative capacity and financial resources, primarily in the North, have successfully invested in healthcare infrastructure, services, and workforce planning. In contrast, southern and inner regions, with weaker institutional frameworks and limited fiscal autonomy, struggle to guarantee even the essential levels of care. This governance structure has led to what she describes as "*modalità di tutela del diritto alla salute diverse a seconda della regione di residenza",* meaning that access to healthcare services and the quality of protection vary significantly across regions, reflecting disparities in administrative capacity, financial resources, and institutional strength.

While such differences are only constitutionally acceptable if all regional health systems guarantee the essential levels of care (LEA), otherwise, they risk undermining the principle of equality under Article 3 and the fundamental right to health under Article 32 of the Constitution[41]. Furthermore, as Balduzzi notes, Article 32 was conceived as both a social right to health protection and a personal freedom right, rooted in the principles of equality and solidarity under Articles 2 and 3 of the Constitution, reflecting the Constituent Assembly's intention to overcome mere charitable approaches and affirm universal and egalitarian health protection[42].

Thus, as Pitino observes, there exist "different modalities for protecting the right to health depending on the region of residence[43]," highlighting the significant territorial disparities embedded within Italy's health system. Similarly, Balduzzi warns that "differentiation, if not governed, tends to expand, with negative effects on equality in the exercise of the right to health[44]." Considered together, these analyses suggest that the decentralised model risks producing systemic inequalities embedded within regional structures, rather than mere administrative variations.

In addition, the disparities between the Northern and Southern regions are increasing. Significant regional differences remain in Italy's healthcare infrastructure and workforce distribution[45]. These structural inequalities are particularly critical in marginalised commu-

[41] A. Pitino, *Il regionalismo differenziato e il conseguimento di 'ulteriori forme e condizioni particolari di autonomia' nella materia 'tutela della salute'*, in *Corti Supreme e Salut*e, 2, 2024, pp. 741-746.

[42] R. Balduzzi, *Quasi un editoriale. Dopo 40 anni, verso una destrutturazione del SSN?,* in *Corti Supreme e Salut*e, 2018, no. 3,2018, pp. 466-467.

[43] A. Pitino, *Il regionalismo differenziato e il conseguimento di 'ulteriori forme e condizioni particolari di autonomia' nella materia 'tutela della salute'*, in *Corti Supreme e Salut*e, 2, 2024, p. 745.

[44] R. Balduzzi, *Quasi un editoriale. Dopo 40 anni, verso una destrutturazione del SSN?,* in *Corti Supreme e Salut*e, 2018, no. 3,2018, p. 473.

[45] According to the country's 2017-2021 health report, northern regions, such as Lombardy and Veneto, consistently report above-average levels of healthcare, including the density of physicians and the availability of hospital beds. In contrast, southern provinces such as Calabria and Basilicata are below national standards, with fewer doctors per 1,000

nities. Additionally, the uneven distribution of healthcare services underscores the need for governance interventions that address regional coverage gaps and optimise the strategic use of digital tools, such as telemedicine. Therefore, telemedicine provides an instrument to overcome geographical barriers to accessing specialist care in inner areas of Italy[46]. Italian healthcare professionals consider telemedicine a valuable tool for improving access to healthcare, particularly in underserved areas. It also reduces wait times, increases continuity of care, and strengthens the capacity to mitigate regional inequities in service delivery[47]. Moreover, by integrating rural patients into a networked system of care, telemedicine fulfils the mandate of Article 32 for uniform healthcare standards, mitigates the tendency towards regional fragmentation, and develops a more integrated national healthcare framework[48].
The capacity of telemedicine to improve equity and harmony is established through ambitious national and EU policy instruments, particularly the PNRR and the 2022 National Directives on Telemedicine Services. In 2022, as part of the National Recovery and Resilience Plan, the Ministry of Health published *Linee di indirizzo nazionali per i servizi di Telemedicina*, establishing technical and organisational standards for delivering remote health services. Furthermore, these guidelines provide a unified legal and operational framework to ensure jurisdiction consistency. By incorporating these standards into *Missione 6 - Salute,* the Italian government has provided a clear roadmap for developing and regulating telemedicine while addressing fragmentation and inequalities in digital health access.
These guidelines also introduce mandatory eligibility protocols, emphasise the central role of telemedicine in managing chronic diseases, and provide a governance model that integrates telemedicine services into the NHS structure, ensuring continuity of care and equitable access nationwide[49]. This policy shift reflects a new anticipated direction towards digital health as a structural counterpart to regional fragmentation.
Furthermore, Italy's digital health initiatives align with the key objectives of the European Union's cohesion policies, particularly Regulation (EU) 2021/1058, which promotes equity in health and digital services in underserved areas. Whereas it does not directly mention telemedicine interventions in the Italian inner areas, the regulation encourages ERDF

inhabitants and fewer acute care resources. Ministero Della Salute, *Relazione sullo stato sanitario del paese 2017-2021*, Ministero della Salute, Rome, 2022, p. 214.

[46] For example, in the Sila Plateau in Calabria, the 2023 Telecardiology Operational Plan implemented direct teleconsultations between peripheral hospitals and cardiologists based in Cosenza. This model significantly reduced the average diagnostic delay and eliminated the need for patients to travel around 80 km round trip for a cardiac examination. Regione Calabria, *Piano Operativo Servizi di Telemedicina - DCA n. 132 del 18/05/2023*, Agenzia Nazionale per i Servizi Sanitari Regionali, 2023, p. 25, *https://www.agenas.gov.it/*.

[47] G. Antonacci *et al.*, *Healthcare Professional and Manager Perceptions on Drivers, Benefits, and Challenges of Telemedicine: Results from a Cross-Sectional Survey in the Italian NHS*, in *Bin MC Health Services Research*, vol. 23, no. 1115, 2023, pp. 1-19.

[48] Costituzione della Repubblica Italiana, art. 32, Gazzetta Ufficiale, December 27, 1947.

[49] Ministero della Salute, *Linee di indirizzo nazionali per i servizi di Telemedicina*, Ministero della Salute, Rome, 2022, pp. 9-10.

funding to improve system sustainability, expand community care, and promote digital transformation[50].

As a tool for eliminating regional inequalities and a basis for structural integration, telemedicine represents a key opportunity to harmonise the decentralised Italian health system with constitutional and EU equality objectives. Its effective implementation, based on national and European standards, positions telemedicine as a strategic tool for overcoming territorial differences and reaffirming the fundamental principles of the NHS.

3.5. Telemedicine's impact on older communities

As DM 77/2022 reaffirmed, telemedicine is a structural component of community health reform, especially for managing chronic diseases in older people living in remote areas. The decree defines organisational standards for territorial healthcare delivery and explicitly incorporates telemedicine through instruments such as the *Case della Comunità* and the *Centrali Operative Territoriali* in terms of a broader transition to integrated, nearby care, especially in inner areas of Italy, emphasising the importance of chronic disease management[51].

Furthermore, the population structure in the underserved areas is characterised by chronic depopulation and accelerated ageing, with individuals aged 65 and over accounting for 25.2%, a proportion notably higher than the national average of 24.3%[52]. Moreover, the demographic imbalance is even more pronounced in peripheral and ultra-peripheral municipalities, where the elderly population reaches 25.9% and 26.8%, respectively[53]. Within the framework of the NHS, telemedicine has been formally integrated as a strategic tool for addressing the healthcare needs of these communities[54]. Furthermore, national guidelines for telemedicine emphasise the benefits of access to continuity of care, chronic disease management, and specialised care, especially for people living in underserved areas[55]. Therefore, telemedicine plays an important role in expanding access to healthcare and managing chronic diseases among older individuals in the Italian inner areas, where

[50] European Parliament & Council, *Regulation (EU) 2021/1058 on the European Regional Development Fund and Cohesion Fund*, in *Official Journal of the European Union*, L 231, June 30, 2021, pp. 60-61.

[51] Ministero della Salute, *Decreto Ministeriale 23 maggio 2022, n. 77: Regolamento recante la definizione di modelli e standard per lo sviluppo dell'assistenza territoriale nel Servizio sanitario nazionale*, Gazzetta Ufficiale Serie Generale n.144 (22.06.2022): 1-59, *https://www.gazzettaufficiale.it/eli/id/2022/06/22/22A03807/sg*.

[52] Istat, *La demografia delle aree interne: dinamiche recenti e prospettive future*, Istituto Nazionale di Statistica, Rome, July 29, 2024, pp. 8-9.

[53] This segment experiences high prevalence rates of chronic illnesses, including hypertension, diabetes, and cardiovascular diseases, placing sustained pressure on the healthcare system, particularly in the absence of nearby hospitals and specialist care.
Istat, *La demografia delle aree interne: dinamiche recenti e prospettive future*, Istituto Nazionale di Statistica, Rome, July 29, 2024, pp. 8-9.

[54] Ministero della Salute, *Relazione sullo stato sanitario del paese 2017-2021*,Ministero della Salute, Rome, 2022, pp. 205-209.

[55] Ministero della Salute, *Linee di indirizzo nazionali per i servizi di Telemedicina*,Ministero della Salute, 2022, pp. 4-6.

a lack of infrastructure aggravates existing inequalities[56]. Moreover, these challenges are compounded by long distances to health facilities and inadequate public transportation[57]. In this context, telemedicine is becoming a key element of territorial health reform, particularly for ageing populations in remote and structurally disadvantaged areas. Providing continuous home care for chronic conditions strengthens the NHS's ability to address demographic challenges while meeting its constitutional obligation to provide equitable health services that consider proximity.

4. Challenges of telemedicine in Italy's inner areas

Although telemedicine has been widely promoted as a solution to territorial inequalities in healthcare, its implementation in the Italian inner areas has revealed a complex interplay of limitations. This includes technological and infrastructural limitations, legal and regulatory uncertainties, socio-cultural resistance, and weakened therapeutic relationships that deepen the vulnerability of marginalised communities[58]. These challenges are particularly critical in areas characterised by depopulation, low service density, and the vulnerability of an ageing population. Academic literature and national reports highlight that the implementation of telemedicine in decentralised systems, such as Italy, suffers from fragmentation, lack of interaction and uneven governance at the regional level[59].
Moreover, digital health initiatives often fail to consider cultural specificities, care dynamics based on faith, and multiple language territories. Furthermore, digital health initiatives often fail to address health's cultural, communication, and linguistic dimensions, particu-

[56] Molise, for example, has the country's lowest number of health professionals, with only 3.4 doctors per 1,000 people, significantly below the Italian average of 5.0. Similarly, Basilicata has one of the country's lowest hospital beds for patients requiring intensive care, with just 2.6 beds per 10,000 inhabitants, compared to 4.0 beds in many northern communities. See Istat, *Equitable and Sustainable Well-being in Italy - 2023 Edition*, Rome, 2024, pp. 280-282.

[57] *Ibid.,* p. 296. This indicator shows that many people are unable to access medical care, not just because of financial difficulties or long waiting lists, but also due to practical barriers such as living far from health facilities or lacking reliable public transportation. These challenges are prevalent in inner areas, where health services are more dispersed and transportation options are limited. As ISTAT highlights, such territorial obstacles create absolute inequalities in healthcare access, undermining the principle of universal and equal health protection guaranteed by the Constitution.

[58] According to Petretto et al., promoting digital health equity requires recognising how different barriers, such as limited device availability, poor internet access, low digital literacy, lack of private spaces for consultations, and cultural or language barriers, interact and reinforce one another. This interdependence means that addressing a single limitation is insufficient if other systemic or contextual barriers remain unaddressed, ultimately creating compounded and mutually reinforcing obstacles to equitable access to telemedicine. See D.R. Petretto *et al.*, *Telemedicine, e-Health, and Digital Health Equity: A Scoping Review*, in *Clinical Practice & Epidemiology in Mental Health* 20, 2024, pp. 2-4.

[59] S. Lorusso *et al.*, *Italian Health Data System: Current Data Interconnection and Digital Health Ecosystem Evolution*, in *The Lancet Regional Health - Europe* 51, 2025, pp. 1-2.

larly prevalent factors in rural and mountainous areas where trust-based care models and diverse sociolinguistic profiles predominate[60].

To become a genuine instrument of territorial justice, telemedicine must go beyond a universal solution and adapt to the needs of Italian governance's specific economic, demographic, infrastructural, and cultural aspects. Without policies and comprehensive implementation strategies, digital health can only reproduce the inequalities it intends to address rather than eliminate them.

4.1. The digital divide and unequal access

Law 833/1978, which established the Italian National Health Service, enshrined the principles of universality and equality in healthcare provision. It was designed to ensure equal access to essential health services for all citizens throughout the country[61]. Nevertheless, the digital divide is a fundamental barrier to the equitable distribution of telemedicine, systematically depriving remote communities and compromising the principles of NHS. Furthermore, this infrastructural segregation is not merely a technical deficiency but an institutional determinant of exclusion. According to Van Dijk's reflections, the digital divide framework considers access, opportunity, and use as interrelated dimensions of digital inequality, with one of the leading digital inequalities being digital illiteracy. Moreover, digital illiteracy remains a critical barrier to the adoption of telemedicine in the Italian inner areas, increasing existing vulnerabilities among marginalised groups. Despite the ageing population aggravated by youth outmigration and low birth rates[62], these communities also face low levels of education. In addition, depopulation, weak service infrastructures, and social exclusion disproportionately affect older and less-educated residents, further deepening territorial inequalities[63]. These demographic dynamics and technological barriers pose significant challenges to equitable access to digital health services, including telemedicine.

Moreover, digital technologies influence the caregiver-patient relationship in the context of telemedicine. While supervision can enhance a sense of intimacy and continuity, referred to as "*digital intimacy*", technical limitations, such as unstable information systems and asynchronous communication, can destroy user trust and engagement. When system issues lead to broken communication or delayed responses, patients report confusion, frustration, or withdrawal, revealing that even minor technological errors in a digital care

[60] M. Ramachandran *et al.*, *The Impact of eHealth on Relationships and Trust in Primary Care: A Review of Reviews*, in *BMC Primary Care*, 24, no. 228, 2023, pp. 2-6.

[61] Italy. *Law No. 833 of 23 December 1978: Establishment of the National Health Service. Gazzetta Ufficiale della Repubblica Italiana*, no. 360, 28 December 1978.

[62] Istat, *La demografia delle aree interne: dinamiche recenti e prospettive future*, Istituto Nazionale di Statistica, Rome, July 29, 2024, pp. 8-9

[63] *Ibid*, pp. 3-4, 6-7.

setting can have significant emotional and relational consequences[64]. These observations highlight that the successful implementation of telemedicine depends on the accessibility, reliability, and responsiveness of the digital platform.

Furthermore, in Italy, digital access remains a critical obstacle to the implementation of telemedicine, particularly in peripheral and ultraperipheral municipalities where infrastructure and population constraints are particularly pronounced. The digital vulnerability of these regions, where populations are older, less mobile and more likely to face systemic barriers to technology adoption, is significant[65]. These challenges suggest that the lack of up-to-date and appropriate digital tools may aggravate inequalities in access to virtual healthcare, particularly for services that require real-time interaction or high-intensity transmission.

Moreover, the intersection of infrastructural gaps and limited human capital is particularly marked among the older individuals living in the most disadvantaged areas[66]. These inequalities pose serious barriers to accessing telemedicine, particularly for vulnerable communities. While older people face issues with digital literacy and connectivity, migrants and linguistic minorities face additional challenges, such as language barriers, which will be explained in more detail in the final argument.

Likewise, the European Commission's Digital Health Report 2018 highlights persistent disparities in digital infrastructure and access across EU regions, noting that rural and mountainous areas are particularly vulnerable to digital exclusion. Furthermore, the Commission emphasises the importance of accelerating investments in broadband access and interoperability systems to prevent these inequalities from worsening[67].

Additionally, digital exclusion is deepened by a lack of technology that delays service delivery. Environmental disasters such as snowstorms, landslides, and repeated power outages often disrupt connectivity in mountainous areas. Furthermore, in inner areas, which account for 70% of high-risk earthquake zones, telemedicine fails as an emergency response mechanism when connectivity is disrupted[68]. This vulnerability highlights a critical paradox: while telemedicine aims to increase resilience, its effectiveness depends on a strong technological foundation often lacking in remote areas, necessitating reevaluating the deployment strategy in the Italian inner healthcare ecosystem.

Therefore, if telemedicine is not integrated into a solid, comprehensive and territorially sensitive digital infrastructure, it risks both filling the existing healthcare gaps and

[64] E.M. Piras & F. Miele, *On Digital Intimacy: Redefining Provider-Patient Relationships in Remote Monitoring*, *Sociology of Health & Illness*, vol. 41, no. S1, 2019, pp. 116-131.

[65] Istat, *La demografia delle aree interne: dinamiche recenti e prospettive future*, Istituto Nazionale di Statistica, Rome, July 29, 2024, pp. 6-9.

[66] Istat, *Equitable and Sustainable Well-being in Italy - 2023 Edition*, Istituto Nazionale di Statistica, Rome, 2024, pp. 273.

[67] European Commission, *Communication: Enabling the Digital Transformation of Health and Care in the Digital Single Market; Empowering Citizens and Building a Healthier Society*, COM (2018) 233 final, April 25.

[68] Istat, Rischio Sismico nei Comuni Italiani 2022 (Rome: ISTAT, 2022), p. 12, *https://www.istat.it/it/archivio/275890*.

strengthening structural inequalities, ultimately undermining the constitutional promise of universal and equal access to healthcare as implemented by Law 833/1978.

4.2. Clinical and diagnostic limitations

The clinical use of telemedicine in inner areas of Italy remains limited due to the inability to fully replicate the physical examination, which healthcare professionals consider essential for accurate diagnosis and maintaining the therapeutic relationship between doctor and patient. Furthermore, the lack of face-to-face interaction limits telemedicine's effectiveness in cases requiring integrated clinical assessment, a significant obstacle to replacing traditional methods[69].

Using hybrid delivery models is crucial to addressing the challenge of maintaining patient trust and clinical empathy in digital care, especially in Italy's inner. The "*Casa della Comunità*" hubs, as outlined in the Italian PNRR, integrate telemedicine with physical access points staffed by multidisciplinary teams, providing comprehensive services including specialist consultations, chronic care management, and digital health support. These hubs, which function as centralised structures within a hub-and-spoke organisational model, ensure a flexible continuum between remote and in-person care while strengthening patient relationships and trust[70] .

Within this hub-and-spoke system, the spoke facilities are smaller peripheral centres offering basic health services closer to patients' homes, such as routine monitoring, nursing care, and health promotion interventions. These structures operate synergistically to reduce geographical and social barriers to care while maintaining high standards of clinical safety, empathy, and continuity[71].

The hub-and-spoke model is particularly effective in inner areas where ageing populations and chronic diseases compound access challenges. By allowing patients to receive basic services locally through spokes while accessing multidisciplinary hubs for complex needs, the model enhances adherence, satisfaction, and health outcomes. Telemedicine thus does not substitute face-to-face care but complements it within a structured territorial network, ensuring that technological innovation supports human-centred healthcare rather than undermining it.

Moreover, telemedicine systems have proven effective in treating stable chronic diseases such as diabetes and hypertension and psychological monitoring, especially in primary

[69] G. Antonacci *et al.*, *Healthcare Professional and Manager Perceptions on Drivers, Benefits, and Challenges of Telemedicine: Results from a Cross-Sectional Survey in the Italian NHS*, in *BMC Health Services Research*, vol. 23, no. 1115, 2023, pp. 12-13.

[70] Presidenza del Consiglio dei Ministri, *Piano Nazionale di Ripresa e Resilienza (PNRR): Missione 6- Salute*, Governo Italiano, Rome, 2021, pp. 196; 230.
F. Pennestrì & G. Banfi, Primary *Care of the (Near) Future: Exploring the Contribution of Digitalization and Remote Care Technologies through a Case Study*, in *Healthcare* 11, no. 15, 2023, pp. 3-5, *https://doi.org/10.3390/healthcare11152147*.

[71] *Ibid.*

care. However, these systems have high limitations in clinical situations requiring physical interaction, such as sensory evaluation, auscultation, or diagnostic tests, highlighting their inappropriateness for complex clinical assessments. These gaps are particularly critical in Italy's rural and mountainous areas, where older individuals comprise more than 25% of the population, underscoring the need for health promotion strategies beyond simple digital monitoring[72].

Another limitation of telemedicine is its inability to support physical examination, which undermines its clinical effectiveness, especially in diagnosing and managing complex or acute diseases[73]. Furthermore, the lack of critical diagnostic infrastructure limits the effectiveness of telemedicine in the inner areas of Italy. In these communities, teleconsultations, which lack physical examination and on-site diagnostic tools (e.g., imaging or laboratory services), limit clinicians' ability to make rapid and accurate diagnoses, especially in settings with limited access to healthcare[74].

Although telemedicine has expanded access to healthcare in Lombardy, particularly in response to the COVID-19 pandemic, its widespread use has highlighted essential limitations. Moreover, the regional report highlights the fragmented nature of telemedicine initiatives and the lack of centralised coordination, undermining organisational effectiveness and the quality of provider relationships. In the absence of direct physical interaction, key elements such as nonverbal communication, tactile feedback, and building therapeutic relationships may diminish factors particularly important for complex diagnosis and ongoing patient engagement[75].

Additionally, staffing shortages deepen telemedicine's clinical limitations in remote areas. Physician availability is lower in inner areas than in urban centres and recruitment losses are high in underserved areas, making telemedicine a substitute for in-person healthcare rather than an adjunct. Therefore, the staffing shortages and the fragmented implementation of telemedicine services risk undermining the strategic objectives of the NHS, which, according to the 2022 national guidelines, recognises telemedicine as an essential complement to traditional care. These guidelines emphasise that telemedicine must be organically

[72] M. Peyroteo *et al.*, *Remote Monitoring Systems for Patients With Chronic Diseases in Primary Health Care: Systematic Review*, in *JMIR Mhealth and Uhealth*, vol. 9, no. 12, 2021, pp. 1-10; G. Antonacci *et al.*, *Healthcare Professional and Manager Perceptions on Drivers, Benefits, and Challenges of Telemedicine: Results from a Cross-Sectional Survey in the Italian NHS*, in *BMC Health Services Research*, vol. 23, no. 1115, 2023, pp. 12-13; Istat, *The Geography of Inner Areas in 2020: Territories Between Potential and Weaknesses*, ISTAT, Rome, 2021, pp. 78-79.

[73] According to this survey among Italian healthcare professionals, 66% of respondents indicated that telemedicine cannot wholly replace face-to-face consultations, primarily due to diagnostic limitations resulting from the lack of physical contact and direct observation. G. Antonacci *et al.*, *Healthcare Professional and Manager Perceptions on Drivers, Benefits, and Challenges of Telemedicine: Results from a Cross-Sectional Survey in the Italian NHS*, in *BMC Health Services Research*, vol. 23, no. 1115, 2023, pp. 8-9.

[74] Ministero Della Salute, *Relazione sullo stato sanitario del paese 2017-2021*, Ministero della Salute, Rome, 2022, pp. 237-239.

[75] Polis-Lombardia, *Digitalizzazione della Lombardia: Un approfondimento di alcune dimensioni decisive per una Lombardia digitale*, Polis-Lombardia, Milan, 2022, pp. 37-41.

integrated into clinical pathways and organisational structures to ensure efficiency, effectiveness and sustainability in healthcare systems[76].

While the PNRR has invested heavily in improving telemedicine infrastructure, particularly in underserved areas, the plan primarily focuses on implementing technology and digital platforms. It is of limited strategic importance for clinical training or the development of hybrid care models, which are very important for overcoming the limitations of telemedicine diagnostics[77].

Considering these clinical and organisational limitations, telemedicine should not be seen as a complete replacement for traditional care but rather as a tool that must be adapted to the specific needs of underserved populations. Ensuring its effective integration into the Italian national health service requires infrastructure investments and strategic support for hybrid models, as well as clinical training and diagnostic capacities within the peripheral health ecosystem.

4.3. Fragmentation and interoperability deficits

The *Relazione sullo Stato Sanitario del Paese* 2017-2021 highlights that telemedicine services in Italy remain fragmented and lack homogeneity across regions, posing barriers to equitable and effective healthcare delivery[78]. This fragmentation is not simply a by-product of decentralisation but rather reflects the absence of effective national coordination mechanisms to ensure integration and interoperability between regional telemedicine systems.

To address these challenges, the report outlines the creation of a national platform at the Ministry of Health, which will serve as a central point for validating, cataloguing, and disseminating telemedicine solutions, as well as providing guidance, information, and training to healthcare professionals and citizens. This initiative aims to create uniform conditions across the national territory, promoting the reuse of validated telemedicine solutions and supporting the cultural, organisational, and technological adoption of these tools in regional health services[79].

Such coordination falls within the state's constitutional competencies, particularly in defining Essential Levels of Care (LEA) under Article 117, paragraph 2, letter m, of the Italian Constitution, which assigns the State responsibility for determining the fundamental levels of healthcare to be guaranteed uniformly throughout the country. Moreover, Article 120 of the Constitution empowers the State to exercise substitutive powers in cases where regional disparities jeopardise the provision of fundamental rights, such as the right to health.

[76] Ministero della Salute, *Linee di indirizzo nazionali per i servizi di Telemedicina*, Ministero della Salute, Rome, 2022, pp. 27-28.

[77] Ministero della Salute, *Relazione sullo stato sanitario del paese 2017-2021*, Ministero della Salute, Rome, 2022, pp. 257.

[78] *Ibid.,* pp. 254-257.

[79] *Ibid.*

Therefore, while regional autonomy in healthcare remains a constitutional principle, effective national coordination and governance are necessary to overcome fragmentation, ensure interoperability, and guarantee equitable access to telemedicine, particularly for populations in Italy's underserved areas.

Although PNRR invests heavily in developing telemedicine infrastructure, the focus is on the technological infrastructure and organisational frameworks needed to support digital health. However, the plan places little emphasis on standardising programmatic aspects of telemedicine programmes and clinical training, which are essential for the practical and interactive implementation. As a result, disparities in digital health capacity continue, particularly in remote areas, where the lack of trained personnel and standardised operational protocols limits the potential of telemedicine to improve care continuity and equity[80].

These areas are vulnerable and have reduced access to essential services, including healthcare. In this context, limitations in the coordination and delivery of care pose a considerable risk, especially when digital systems fail to consistently manage the integration and complexity required to hand over care to specialists on time. This inefficiency violates the NHS's constitutional commitment to equitable care, as rural patients, who are older and more socio-economically vulnerable, bear the brunt of fragmented services[81].

However, the European Commission emphasises the urgent need to address the fragmentation and lack of interaction between EU health systems that compromise the development of effective and integrated digital health services[82]. These challenges are particularly acute in Italy's inner areas, where inadequate infrastructure, outdated regulatory frameworks, and clinical workflows designed for in-person care hinder the effective adoption of digital health technologies, further exacerbating territorial disparities[83].

Addressing the fragmentation of telemedicine in Italy requires more than technological expansion. As highlighted in the OASI 2023 Report, while the PNRR has channelled significant investments into telemedicine infrastructure, the implementation remains fragmented, with regional disparities in operational models, reimbursement systems, and service availability[84]. Furthermore, this fragmentation is rooted not merely in the structural organ-

[80] Presidenza del Consiglio dei Ministri, *Piano Nazionale di Ripresa e Resilienza (PNRR)*, PCM, Rome, 2021, pp. 273-275.

[81] Therefore, Calabrian users' poor digital skills and knowledge led to misconceptions about telemedicine services, with almost half of the respondents' reporting difficulties in understanding digital content. This raises questions regarding the practical and ethical use of telemedicine tools, including informed consent and the risk of data interpretation and misuse, which need to be addressed in light of data protection principles and patient rights. L. Taddei, F. Mendicino, T. Grande, A. Mulé, R. Micozzi, & E. G. Parini, *Contributions of Digital Social Research to Develop Telemedicine in Calabria (Southern Italy): Identification of Inequalities in Post-COVID-19*, *Frontiers in Sociology*, vol. 8, 2023, pp. 10-11.

[82] European Commission, *Communication on Enabling the Digital Transformation of Health and Care in the Digital Single Market: Empowering Citizens and Building a Healthier Society*, COM (2018) 233 final, Brussels, April 25, 2018, pp. 2-3.

[83] D. Golinelli *et al.*, *How the COVID-19 Pandemic Favored the Adoption of Digital Technologies in Healthcare: A Systematic Review of Early Scientific Literature*, JMIR Preprints, 2020, p. 20. *https://doi.org/10.2196/preprints.22280*

[84] M. Bobini *et al.*, *La telemedicina verso il consolidamento: assetti organizzativi formalizzati ed emergenti nel SSN*, in *Rapporto OASI 2023*, CERGAS Bocconi, pp. 474-476.

isation of the healthcare system but in the absence of coherent, standardised policies and integrated governance frameworks that can guide regions towards shared objectives and interoperable solutions.

Therefore, without national coordination capable of defining uniform standards, models of care, and operational guidelines, telemedicine risks remaining an episodic or isolated innovation rather than becoming a systemic resource embedded within care pathways[85]. In the absence of a unified legal and effective national coordination, it may remain fragmented, ultimately failing to reduce, and potentially even reinforcing, existing territorial inequalities, as Balduzzi observes concerning the broader health system, where differentiation, if not effectively governed, tends to crystallise disparities rather than overcome them[86].

4.4. Increased physician workload and systemic pressure

Although telemedicine promises efficiencies for home care, its implementation increases pressure on limited human resources. Moreover, with a shortage of ICT-trained staff, especially in small municipalities, the digital divide may increase the workload of local healthcare facilities and compromise expected benefits[87]. Contrary to its original role as a labour-saving innovation, telemedicine significantly increases the workload of rural professionals, who play multiple roles, including primary care physicians, first responders, and community health promoters, among others, in the face of staff shortages. With the introduction of telemedicine into rural healthcare workflows, the demands placed on physicians are expected to increase dramatically, aggravating the already strained human resource situation. Furthermore, inner areas of Italy are experiencing a shortage of healthcare workers[88], and the high workload is a barrier to the adoption of telemedicine[89]. Typically, the workload increases due to the additional responsibilities of patient communication, and healthcare providers are often described as time-consuming, even though

[85] *Ibid.,* pp. 476-478.

[86] R. Balduzzi, *Quasi un editoriale. Dopo 40 anni, verso una destrutturazione del SSN?,* in *Corti Supreme e Salute*, 2018, no. 3,2018, p. 473.

[87] The total number of INHS health workers decreased significantly between 2009 and 2019, primarily due to employment restrictions. This resulted in a 5% decrease in medical staff and a 3% decrease in nursing staff. These shortcomings included a 15% drop in population in some areas, creating a huge disparity compared to urban areas like Lombardy. Istat, *Rapporto Annuale 2022: La situazione del Paese*, Istituto Nazionale di Statistica, Roma, 2022, pp. 67-68.

[88] Ministero della Salute, *Relazione sullo stato sanitario del paese 2017-2021*, Ministero della Salute, Rome, 2022, pp. 212-213, 4, 15

[89] G. Antonacci *et al.*, *Healthcare Professional and Manager Perceptions on Drivers, Benefits, and Challenges of Telemedicine*: *Results from a Cross-Sectional Survey in the Italian NHS*, BMC Health Services Research, vol. 23, no. 1115, 2023, pp. 8.
This study's findings show that 75% of Italian healthcare professionals living in inner areas cited workload as the main barrier to telemedicine. In comparison, 55% believe virtual visits take an average of 20 minutes longer due to additional referral processes and technology inefficiencies.

communication has improved[90]. Therefore, the reallocation of work highlights the hidden costs of digital health innovation, suggesting that telemonitoring may increase system inefficiencies without adequate institutional resources and staffing.

In underserved areas of Italy, the combination of a rapidly ageing population and digital exclusion poses a threat to access to healthcare, mainly through telemedicine. The remaining population is not only older but often lacks digital literacy or internet access, meaning many cannot effectively use telehealth services. As a result, telemedicine, a critical innovation for reaching patients in remote communities, often fails to serve those most in need, further deepening health inequalities in underserved communities and highlighting structural weaknesses that require urgent normative and institutional reforms [91].

Despite national efforts to promote telemedicine, challenges remain for its effective implementation in underserved areas of Italy. Insufficient investment in training and reward mechanisms for healthcare professionals is a significant barrier. The Ministry of Health recognises this gap and emphasises the need for national guidelines, continuous professional development and information platforms to strengthen technical expertise and trust. However, structural inequalities persist, especially in remote areas where frontline professionals lack individual support or workload-based compensation. Without systematic training, the introduction of telemedicine, particularly in resource-constrained communities, risks exacerbating existing inefficiencies rather than mitigating them[92].

Continued inefficiencies in telemedicine implementation risk undermining NHS' broader efficiency goals. According to the 2022 National Guidelines for Telemedicine Services, telemedicine is not a peripheral or pilot tool but a strategic lever to support continuous improvement, relevance, and efficiency in healthcare delivery[93]. Furthermore, these guidelines explicitly position telemedicine to optimise clinical processes, reduce unnecessary hospitalisations, and strengthen regional equity. Nevertheless, the failure to integrate telemedicine into structured and evaluated care pathways, supported by governance mecha-

[90] E.M. Piras & F. Miele, *On Digital Intimacy: Redefining Provider-Patient Relationships in Remote Monitoring*, in *Sociology of Health & Illness*, vol. 41, no. S1, 2019, pp. 125-126
In this qualitative study on diabetes telemonitoring in the Autonomous Province of Trento conducted, healthcare professionals experienced an increased workload due to the additional responsibilities of patient communication and digital documentation. While these activities enhance continuity and quality of communication, professionals describe them as time-consuming, dedicating specific periods of the day to managing patient information and responding to messages. Although this study does not explicitly address administrative staff, Piras and Miele (2019) argue that the introduction of remote monitoring technologies has dramatically increased the coordination and communication tasks of healthcare providers. Nurses reported that digital documentation, platform navigation, and asynchronous messaging with patients became part of their workflow, often outside of clinical hours. While these practices increased continuity of care and strengthened the doctor-patient relationship, they were described as "time-consuming" and burdensome, contributing to the intensification rather than the regulation of professional accountability.

[91] Istat, *La demografia delle aree interne: dinamiche recenti e prospettive future*, Istituto Nazionale di Statistica, Rome, July 29, 2024, pp. 1, 8.

[92] Ministero della Salute, *Relazione sullo stato sanitario del paese 2017-2021*, Ministero della Salute, Rome, 2022, p. 257.

[93] Ministero della Salute, *Linee di indirizzo nazionali per i servizi di Telemedicina*, Ministero della Salute, Rome, 2022, p. 6.

nisms and performance indicators, contradicts its institutional purpose and may aggravate rather than alleviate the burden on the system.

In this context, telemedicine poses the risk of converting an efficiency benefit into an institutional burden by placing the cost of innovation on already overworked rural health personnel. Without targeted investments in training, workforce development, and support mechanisms, the digital transformation of health care could worsen existing inequalities and undermine the constitutional mandate for equitable and sustainable health care for all.

4.5. The weakening of the therapeutic relationship between doctor and patient

The rise of telemedicine brings opportunities and concerns in redefining the therapeutic relationship, a pillar embedded in Italy's clinical practice culture. Furthermore, national guidelines recognise that digital mediation can complicate the doctor-patient relationship, particularly in settings where trust, respect, and effective communication are essential. While telemedicine enables continuity of care, it also alters the relationship dynamics, deliberating efforts to maintain patient trust and emotional connection in a virtual setting. This challenge is particularly pronounced in remote and socio-economically vulnerable areas, where digital literacy and access barriers can aggravate communication gaps[94]. This relational bond, essential to achieving healthcare results, is based on trust, compassion, and familiarity. It is deeply rooted in rural social structures, where nurses play a key role. Moreover, the shift to virtual telemedicine interactions disrupts this dynamic, reducing the opportunity for explicit engagement and informal assessments that are very important to patient well-being.

While these new technical advancements can increase access and efficiency, they raise ethical and medico-legal concerns, especially in diagnostic errors or technological failures. In this context, Law 24/2017, commonly known as the Gelli-Bianco Law, becomes particularly relevant. This law strengthened the legal framework for patient safety and medical liability in Italy, introduced mandatory clinical risk management, promoted compliance with approved clinical guidelines, and set standards for the liability of healthcare professionals. Although initially developed with traditional in-person care in mind, its principles apply equally to telemedicine services, which should be subject to the same standards of safety and accountability. Recognising this legal continuity is important to ensure digital innovation does not undermine patients' rights or healthcare professionals' duties, especially in underserved or digitally vulnerable areas[95].

[94] *Ibid.*, p. 38.

[95] *Legge 8 marzo 2017, n. 24, Disposizioni in materia di sicurezza delle cure e della persona assistita, nonché in materia di responsabilità professionale degli esercenti le professioni sanitarie* (Gelli-Bianco Law), Gazzetta Ufficiale, no. 64, March 17, 2017.

The high proportion of the elderly population underscores the importance of maintaining continuity of communication and patient trust, which has historically depended on face-to-face models of care and is now increasingly challenged by digital delivery formats[96]. Furthermore, psychiatry and palliative care, specialities that rely heavily on the continuity of relationships and trust, are central to caring for the older population. In Italy, 13% of people over 65 report symptoms of depression, a percentage that rises to 22% after 85 and is significantly higher among those in economic hardship[97]. These patterns highlight the growing mental health and palliative care needs of older adults, many of whom live in underserved areas. Additionally, it is reasonable to highlight that social structure plays a crucial role in maintaining trust-based relationships between residents and healthcare providers. In such a setting, face-to-face clinical disruption may have more profound relational consequences than in an urban setting. Therefore, the shift to digital telemedicine risks disrupting cultural expectations for care as a relational and embodied practice[98]. While the European Commission's 2018 Digital Health Strategy does not provide quantitative data on the experience of rural users, it highlights the risk of fragmentation and digital exclusion unless virtual provision is designed to meet the diverse needs of all communities. This report advocates for the strategic deployment of digital technologies to deliver person-centred care, particularly in health systems facing inequalities in access and infrastructure. In this context, underserved areas may be particularly vulnerable to communication disruptions when digital tools replace traditional face-to-face care without adequate cultural and systemic adaptation[99].

However, while investments prioritise infrastructure and technology components, such as teleconsultation, remote monitoring, and interoperability with the Electronic Health Record, little emphasis is placed on virtual care's relational and communicative dimensions. Furthermore, the plan outlines technical and managerial training initiatives for healthcare professionals. Nevertheless, it does not explicitly address the development of therapeutic

[96] Istat, *The Geography of Inner Areas in 2020: Territories Between Potential and Weaknesses*, ISTAT, Rome, 2022, pp. 5-6.

[97] Ministero Della Salute, *Relazione sullo stato sanitario del paese 2017-2021*, Ministero della Salute, Rome, 2022, p. 61. Although this report does not describe differences between rural and urban areas, the data highlight a gradient in vulnerability that warrants attention to how digital care models such as telemedicine may impact therapeutic relationships in complex care settings.

[98] E.M. Piras & F. Miele, *On Digital Intimacy: Redefining Provider-Patient Relationships in Remote Monitoring*, in *Sociology of Health & Illness*, vol. 41, no. S1, 2019, pp. 116-131.
This ethnographic study of remote diabetes monitoring in Trento shows that the shift to telemedicine is reshaping the doctor-patient relationship in complex ways. While their study does not quantify psychological resistance or anxiety, it highlights the emotional and relational work required to foster trust in digitally delivered interventions.
Initial unfamiliarity with messaging platforms caused anxiety for some patients and clinicians, but over time, consistent digital interactions created a sense of intimacy and continuity not present in conventional care settings. These findings challenge the assumption that telemedicine necessarily erodes relational care, suggesting instead that digital intimacy is possible, albeit requiring adaptation, care, and institutional support.

[99] European Commission, *Communication on Enabling the Digital Transformation of Health and Care in the Digital Single Market: Empowering Citizens and Building a Healthier Society*, COM (2018) 233 final, European Commission, Brussels, 2018, pp. 11-12.

skills or hybrid care models essential for maintaining trust in digital environments. This gap is critical in rural and mountainous areas, where long-term doctor-patient relationships are necessary for quality care. Hence, transitioning to virtual formats can be jeopardised without proper professional guidance and support. Also, this gap maintains a technology-oriented approach, overlooking the socio-emotional dimensions essential to rural healthcare.

As telemedicine redesigns a new approach to the doctor-patient relationship, it also causes an erosion of the therapeutic alliance. This poses a profound challenge to integrating telemedicine in interior areas, compromising the quality of care and violating socio-cultural norms. Suppose no specific intervention, such as hybrid models combining virtual and in-person care or culturally appropriate training, will be implemented. In that case, this shift risks isolating vulnerable populations and undermining NHS's constitutional commitment to providing holistic and equitable healthcare.

4.6. Legal, ethical and privacy challenges

Despite the promises of telemedicine, the implementation in inner areas of Italy is limited by concerns over data protection and the lack of strong legal measures for patient privacy. According to the WHO, many countries in the European Union, including Italy, cite the lack of a comprehensive legal framework for privacy and data governance as a significant obstacle to the development of telemedicine[100].

These legal uncertainties are particularly consequential in rural and mountainous areas where digital infrastructure is often fragile, worsening the vulnerability of health information systems to violations and misuse. Although the European Union's GDPR establishes a common legal framework, its implementation and application vary by region, especially in areas with limited administrative capacity[101]. Italy's decentralised healthcare system complicates integrated compliance with digital healthcare standards. Moreover, differences in regional implementation, licensure, and informed consent procedures introduce legal ambiguities that can undermine provider and patient confidence in telemedicine systems[102].

Furthermore, the complexity of regulatory layers where regulations at regional, national, and EU levels intersect overwhelms rural healthcare providers and limits the use of telemedicine services. The Fields' reflections highlighted the need for a strong legal and ethical infrastructure that ensures security, accountability, licensing, consent and transparency

[100] World Health Organization, *Legal Frameworks for eHealth: Based on the Findings of the Second Global Survey on eHealth*, WHO, Geneva, 2012, p. 9.

[101] A. Spadaro *et al.*, *Introducing Telemedicine in Italy: Citizens' Awareness of a New Healthcare Paradigm*, in *Healthcare*, vol. 11, no. 15, 2023, pp. 2-4, *https://www.mdpi.com/2227-9032/11/15/2157*.

[102] B.G. Fields, *Regulatory, Legal, and Ethical Considerations of Telemedicine*, in *Sleep Medicine Clinics*, vol. 15, no. 3, 2020, pp. 410-413, *https://doi.org/10.1016/j.jsmc.2020.06.004*.

regarding protected health information for telemedicine to succeed[103]. More specifically, the principle of autonomy requires patients to be fully informed about their options, including how they access care and how their data will be handled, especially in digital formats that may cross jurisdictional boundaries[104]. Moreover, risk perceptions of privacy violations are a critical barrier to provider and patient adoption[105].

In inner areas, where the population is often older and digital illiteracy is high, trust in digital health systems relies on transparent data practices and reliable mechanisms. Without these, digital health technologies risk reinforcing, rather than addressing, geographical inequalities. Additionally, to fully realise the potential of telemedicine in Italian local communities, policymakers need to prioritise legal regulation, ethical oversight, and practical training over infrastructure investments. Moreover, this includes adopting privacy principles, training local health workers on data security and digital consent processes and establishing clear and enforceable policies at the regional level.

Without a transparent legal framework and regionally coordinated data privacy policy, telemedicine risks losing public trust and failing to achieve equitable healthcare delivery's moral and legal requirements. In addition to technical compliance with the GDPR, a strong legal culture of informed consent, accountability and adaptation to the vulnerabilities of decentralised health systems is needed to ensure the legitimacy and sustainability of decentralised health systems in Italy.

4.7. Socio-cultural and linguistic barriers

The introduction of telemedicine in the inner areas of Italy faces not only infrastructural and legal challenges but also substantial socio-cultural and language barriers, which risk

[103] D. Ferorelli *et al.*, *Medical Legal Aspects of Telemedicine in Italy: Application Fields, Professional Liability and Focus on Care Services During the COVID-19 Health Emergency*, *Journal of Primary Care & Community Health*, vol. 11, 2020, pp. 3-5, *https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7780315/*.

[104] The principle of patient autonomy, which is grounded in the constitutional guarantees of personal dignity and self-determination under Articles 2 and 32 of the Italian Constitution, requires that patients be fully informed about their healthcare options. This includes not only the modalities through which they access care but also how their personal data will be processed, particularly in digital health services that may cross jurisdictional boundaries. Although the Constitution does not explicitly use the term "*self-determination*," Italian Constitutional Court jurisprudence has consistently interpreted the inviolable rights of the person (Art. 2) and the right to health (Art. 32) as encompassing the individual's freedom to make informed choices about their own health and body. See: *Corte Costituzionale, sent. n. 438/2008*. The Court in this judgment recognised informed consent as an expression of the principle of personal self-determination, derived from Articles 2 and 32 of the Constitution, emphasising that health treatments without consent violate personal dignity and freedom. See also*: Corte Costituzionale, sent. n. 242/2019*. The Court in this judgment affirmed that the principle of personal self-determination encompasses end-of-life decisions, interpreting Articles 2, 13, and 32 of the Constitution as protecting an individual's freedom to make choices concerning their body and health, thereby respecting their dignity.

[105] B.G. Fields, *Regulatory, Legal, and Ethical Considerations of Telemedicine*, in *Sleep Medicine Clinics*, vol. 15, no. 3, 2020, p. 415, *https://doi.org/10.1016/j.jsmc.2020.06.004*.

increasing inequalities in access to care. These areas, with strong cultural and local identities and the presence of linguistic minorities, such as Ladin, Friulian, and Sardinian speakers, pose unique challenges regarding standardised digital health provision. Although telemedicine platforms target urban and Italian-speaking populations, they rarely consider this diversity: a 2023 national study found that only 10% of digital health platforms offer multilingual or localised interfaces[106].

This gap between platform design and local cultural and linguistic realities directly impacts the adoption of telemedicine. Furthermore, physicians working in rural and mountainous areas reported that socio-cultural resistance, characterised by digital scepticism, language barriers, and discomfort with virtual care, remains one of the main barriers to effectively adopting telemedicine. This resistance is particularly pronounced among older patients, who often refuse remote healthcare due to deep cultural mistrust and unfamiliarity with long-distance clinical interactions[107].

Besides, social cohesion, territorial affiliation, and relational proximity are essential components of everyday life in inner communities. Therefore, these factors cannot be ignored when planning and delivering services, including healthcare. Telemedicine significantly shifts from the traditional, face-to-face relationships established with community physicians for many older adults, particularly those in rural or underserved areas. Rather than completely replacing in-person meetings, virtual help is often less personal and less effective, especially for complex situations or emotional conversations[108]. Usually, older adults and healthcare professionals admit that despite the convenience of telemedicine, they do not see telephone consultations as a "*real medical act*" and prefer in-person meetings to maintain a sense of personal contact[109]. Therefore, a hybrid model that acknowledges older adults' relational expectations and maintains the value of physical presence in care delivery is needed.

[106] G. Antonacci *et al.*, *Healthcare Professional and Manager Perceptions on Drivers, Benefits, and Challenges of Telemedicine: Results from a Cross-Sectional Survey in the Italian NHS*, *BMC Health Services Research*, vol. 23, no. 1115, 2023, pp. 9.

[107] This study found that 64% of physicians working in rural and mountainous areas identified socio-cultural resistance, including digital scepticism, language barriers, and discomfort with virtual care models, as the main obstacles to successful implementation. Among elderly patients in Friuli-Venezia Giulia, 50% rejected telemedicine due to cultural mistrust and unfamiliarity with long-distance medical communication.
G. Antonacci *et al.*., *Healthcare Professional and Manager Perceptions on Drivers, Benefits, and Challenges of Telemedicine: Results from a Cross-Sectional Survey in the Italian NHS*, in *BMC Health Services Research*, vol. 23, no. 1115, 2023, p. 9.

[108] K. Ladin *et al.*, *Perceptions of Telehealth vs In-Person Visits Among Older Adults with Advanced Kidney Disease, Care Partners, and Clinicians*, in *JAMA Network Open*, vol. 4, no. 12, 2021, pp. 4-6.

[109] In this qualitative study of adults with chronic kidney disease in the United States, participants repeatedly expressed concerns about the virtual format, citing a lack of interpersonal connection and difficulty building trust, especially when discussing complex diagnoses. V. Khanassov *et al.*, *Telemedicine in Primary Care of Older Adults: A Qualitative Study*, *BMC Primary Care*, vol. 25, no. 259, 2024, pp. 5-6.

The accelerated telemedicine and digital healthcare expansion may aggravate existing disparities when vulnerable groups' socio-cultural, linguistic, and economic contexts are not considered[110]. If these limitations are not addressed, marginalised populations risk being excluded from innovations designed to improve equity. Therefore, culturally sensitive strategies, such as integrating community-based digital literacy programs, multilingual support, and locally designed interfaces, are essential.
To ensure that telemedicine promotes inclusion rather than exclusion, digital health strategies must be based on cultural sensitivity, linguistic accessibility, and relational care models that reflect the realities of life in the Italian interior. Without these adaptations, telemedicine risks becoming a homogenising force that ignores local identities and exacerbates the inequalities it seeks to address.

5. Final Considerations

Telemedicine is important at the intersection of technological innovation, constitutional accountability, and public health equity. In Italy's inner areas, with an ageing population, limited infrastructure, and largely compromised access to essential services, telemedicine represents more than a technical advancement: it is a potential instrument for institutional reform and territorial equity. Furthermore, as emphasised throughout this article, its potential for change should be assessed regarding its practical results and its normative compatibility with the principles enshrined in the Italian Constitution.
Moreover, the COVID-19 pandemic has served to accelerate and expose digital health governance. While this has generated significant interest in remote health services, it has exposed telemedicine's fragmented and uneven nature across different regions and areas. In addition, telemedicine risks increasing inequalities rather than resolving them without institutional coordination[111]. These concerns echo broader research indicating that decentralised healthcare systems, such as Italy's, face structural challenges in coordinating digital care pathways due to regional disparities and uneven implementation of national data standards[112]. Additionally, digital health systems can deepen existing regional disparities, particularly in underserved areas.
To mitigate these risks, Italy's PNRR has committed to developing more than 600 "*Centrali Operative Territoriali*" and "*Case della Comunità*" facilities designed to provide integrated,

[110] D.R. Petretto *et al.*, *Telemedicine, e-Health, and Digital Health Equity: A Scoping Review*, *Clinical Practice & Epidemiology in Mental Health*, vol. 20, 2024, pp. 3-4.

[111] D. Morana, F. Morganti, & T. Balduzzi, *La salute "intelligente": eHealth, consenso informato e principio di non-discriminazione*, in *Federalismi.it*, no. 34/2022, pp. 5-10, *https://www.federalismi.it/nv14/articolo-documento.cfm?Artid=48198*.

[112] S. Lorusso *et al.*, *Italian Health Data System: Current Data Interconnection and Digital Health Ecosystem Evolution*, in *The Lancet Regional Health - Europe* 51, 2025, pp. 1-2, *https://doi.org/10.1016/j.lanepe.2025.101259*.

multidisciplinary assistance supported by digital tools[113]. Moreover, local healthcare professionals support digital interventions linked to nearby services. This model represents a deliberate shift from fragmented experimentation to structured and systematic reform. Furthermore, these initiatives aim to promote a new culture of care that prioritises continuity, prevention, and integration over traditional models.

However, structural and legal barriers remain. Different reports cite a lack of interoperability between platforms, inconsistent reimbursement policies, and lack of professional training as significant barriers to effective implementation[114]. Furthermore, infrastructural deficiencies, such as limited broadband coverage and digital literacy gaps, disproportionately impact populations. The limitations are particularly pronounced in inner communities, where social cohesion and continuity of care are vital and digital disruption risks damaging trust in relationships[115]. Notably, these barriers intersect with broader patterns of demographic decline and ageing, which threaten the sustainability of local healthcare systems and highlight the urgent need for technologically viable and socially inclusive models of care[116].

To address these challenges, hybrid models that integrate digital and in-person care are needed and designed for local needs and skills. Moreover, telemedicine should be integrated into a team-based, person-centred care environment rather than an isolated technical solution[117]. Relational proximity, rather than just technological accessibility, is critical to clinical responsiveness, patient satisfaction, and adherence to long-term care. Furthermore, the integration of telemedicine should be guided not only by the logic of efficiency but also by constitutional and ethical guidelines. Article 32 of the Italian Constitution guarantees the right to health as an individual right and a collective interest, while Article 3 obliges the state to eliminate social and economic barriers to full participation in the lives of citizens[118]. In this regard, digitalisation should not be interpreted as a substitute for cost savings but rather as a means of achieving fundamental equality in access to healthcare and outcomes. Thus, the implementation of telemedicine must be constitutionally integrated as a tool for territorial justice, primarily where it supports vulnerable populations in accessing the same quality of care guaranteed to all.

[113] Presidenza del Consiglio dei Ministri, *Piano Nazionale di Ripresa e Resilienza*, Rome, 2021, p. 227.

[114] Gruppo di lavoro Sanità Elettronica del CDTI, *Telemedicina: dal dire al fare. Libro Bianco,* Rome, 2014, pp. 10-12, 88-90.

[115] Istat, *Rapporto annuale 2023: La situazione del Paese*,Istituto Nazionale di Statistica, Rome, 2023, pp. 134-136, *https://www.istat.it/it/files//2023/05/Rapporto-annuale-2023.pdf.*

[116] F. Cascini *et al.*, *A New Digital Model for the Italian Integrated Home Care: Strengths, Barriers, and Future Implications*, in *Frontiers in Public Health* 11, 2023, pp. 3-5, *https://doi.org/10.3389/fpubh.2023.1292442.*

[117] F. Pennestrì & G. Banfi, "*Primary Care of the (Near) Future: Exploring the Contribution of Digitalization and Remote Care Technologies through a Case Study*," Healthcare 11, no. 15, 2023, p. 12, *https://doi.org/10.3390/healthcare11152147.*

[118] Corte Costituzionale, *Sentenza n. 509 del 2000*, November 20, 2000, in *Gazzetta Ufficiale della Repubblica Italiana*, Serie Speciale, no. 43, 2000, *https://giurcost.org/decisioni/2000/0509s-00.html.*

At the European level, solidarity policies such as Regulation (EU) 2021/1058 and the 2018 Digital Health Strategy support this vision and encourage investment in equitable and inclusive digital health ecosystem services, digital infrastructure, and community sustainability[119]. They reaffirm the need for a rights-based, territorially sensitive digital transition that is consistent with national constitutional values and broader European goals of solidarity and inclusion.

However, this vision cannot be realised without addressing the workforce shortage that disproportionately affects rural and mountainous areas. Rather than helping to relieve the burden on the workforce, telemedicine often increases the burden on rural providers already operating with limited support. This remote labour intensification threatens the sustainability of digital health unless accompanied by investments in clinical training and workforce models that consider workload. Moreover, these issues highlight the hidden costs of innovation in digital health, where efficiency gains can come at the expense of provider well-being and system sustainability. Legal and ethical gaps further deepen these challenges. While the GDPR provides a single European standard, inconsistent regional application, limited digital literacy, and unclear consent processes impact public trust and delay adoption in underserved areas. Strengthening legal protection, particularly around data governance, is therefore essential. A comprehensive legal infrastructure for telemedicine that guarantees transparency, autonomy and security is a regulatory requirement and a condition for equitable innovation.

In conclusion, for telemedicine to live up to its promise in rural Italy, it must be implemented within a coherent legal framework that recognises territorial diversity, supports healthcare workers, ensures interoperability and prioritises patient-centred care. It must function as a tool for exercising constitutional rights rather than a technocratic replacement for face-to-face care. National guidelines must transition from aspirational to practical, establishing mandatory standards for implementation, financing, and integration into clinical protocols. Telemedicine can only contribute to equity and sustainability within the NHS by combining technological innovation with relational, institutional and legal integrity.

[119] European Union, *Regulation (EU) 2021/1058 of the European Parliament and of the Council of 24 June 2021 on the European Regional Development Fund and the Cohesion Fund*, in *Official Journal of the European Union*, L 231, 2021, pp. 60-93, *https://eur-lex.europa.eu/eli/reg/2021/1058/oj*; European Commission, *Digital Health and Care*, in *Directorate-General for Health and Food Safety*, last updated March 2024, *https://health.ec.europa.eu/ehealth-digital-health-and-care/digital-health-and-care_en*.