IMPLEMENTATION OF TELEHEALTH IN THE LOCAL HEALTH UNIT OF ALGARVE (ULS Algarve)

Barriers, Needs and Opportunities - A Participatory Design Study

Ana Sousa

Supervisor: Minna Aittasalo, D.Sc.
Senior Researcher, Laurea University of Applied Sciences

Date: February 2026

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Abstract

Despite national and European strategies promoting digital health, routine video-based teleconsultations remain uneven across regions. In Portugal's Western Algarve, within the Local Health Unit of Algarve (ULS Algarve), adoption has been limited, revealing a policy–practice gap. This study examined factors underpinning the absence or delayed uptake of teleconsultations at ULS Algarve, identifying barriers, needs, and opportunities from multiple stakeholder perspectives. A qualitative exploratory case study was conducted through nineteen interviews with professionals, managers, ICT staff, patients, and caregivers. Data were analysed using a hybrid thematic approach guided by the Consolidated Framework for Implementation Research (CFIR) and informed by Participatory Design (PD) needs-assessment principles.

Findings reveal widespread recognition of teleconsultation benefits for low-complexity follow-ups, results review, and care for geographically dispersed populations, with pragmatic acceptance among professionals and patients/caregivers. However, adoption faces organisational and infrastructural barriers: lack of video-enabled equipment and configured desktops, insufficient protected time and private spaces, unadapted workflows, and limited on-demand technical support. Stakeholders outlined requirements for a minimum viable setup (basic video infrastructure, protected scheduling, brief practice-oriented training, and clear eligibility and fallback rules) and emphasised equity safeguards to reduce digital exclusion, particularly among older adults.

Limited implementation at ULS Algarve reflects last-mile implementation failures rather than resistance or lack of perceived value. Integrating CFIR and PD yielded actionable insights for a phased, context-aware, equity-focused roadmap to embed sustainable teleconsultations within the public system.

Keywords: teleconsultation; digital health; implementation; participatory design; qualitative research

JEL classification codes: I18; O33

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Glossary

CFIR — Consolidated Framework for Implementation Research

An implementation science framework for identifying determinants influencing the implementation, adoption, and sustainability of interventions.

EHDS — European Health Data Space

An EU initiative aiming to enable secure access, interoperability, and secondary use of electronic health data.

INE — Instituto Nacional de Estatística (Statistics Portugal)

Portugal's national statistical authority used for demographic and regional indicators.

NHS / SNS — National Health Service / Serviço Nacional de Saúde

Portugal's public health system, within which teleconsultations and national digital platforms operate.

PD — Participatory Design

A collaborative approach involving stakeholders to identify needs, constraints, and opportunities; used here in the needs assessment phase.

PDS Live — Plataforma de Dados da Saúde – Live

A Portuguese SNS platform used to support synchronous video-based teleconsultations for remote clinical encounters.

PENTS — Plano Estratégico Nacional para a Telessaúde (National Strategic Plan for Telehealth, 2019–2022)

Portugal's national strategic framework guiding telehealth development and adoption.

SPMS — Serviços Partilhados do Ministério da Saúde (Shared Services of the Ministry of Health)

The national body responsible for governance and development of key digital health systems and services that support the SNS, including telehealth-related platforms.

ULS Algarve — Unidade Local de Saúde do Algarve (Local Health Unit of Algarve)

An integrated regional health organisation in Portugal and the case study setting of this thesis.

Introduction

Digital transformation has emerged as a critical priority in healthcare systems worldwide, driven by the growing challenge of delivering high-quality, efficient, and equitable care to populations. Portugal has shown remarkable progress in this transformation, achieving a digital maturity assessment of 86% in 2023, above the European average, according to the Digital Decade 2025: eHealth Indicator Study (European Commission, 2025).

This progress is particularly evident in the adoption of teleconsultations, which increased significantly during the COVID-19 pandemic, with substantial gains reported across Portuguese regions (Magalhães et al., 2022; ERS, 2022; SPMS, 2024). However, a paradox emerges at the regional level. Despite Portugal's favourable policy environment and high digital maturity, the National Health System transparency portal reports no recorded telemedicine consultations for the Algarve region as of November 2024, in contrast to other regions with substantial activity (SNS Transparency Portal, n.d.-a). Although this regional indicator is reported under the administrative label *telemedicine* and does not specify modality, the absence of recorded activity raises questions about how (and under which conditions) video-based teleconsultations are being operationalised locally. This study, therefore, focuses on the organisational and contextual factors that explain the absence of routine video-based teleconsultations at the Local Health Unit of the Algarve (ULS Algarve), and the conditions required for their feasible and equitable adoption.

This discrepancy in a digitally mature healthcare system motivates a compelling research question. Understanding the local factors influencing the adoption of video-based teleconsultations within the ULS Algarve is therefore essential. This study addresses the following research question: "Which contextual and organisational factors explain the absence of routine video-based teleconsultations at ULS Algarve, and what conditions are required to enable their feasible and equitable adoption?"

This study aims to generate an implementation-informed, stakeholder-grounded understanding of why video-based teleconsultations are not routinely used at ULS Algarve and to derive actionable requirements for a context-sensitive, equity-oriented adoption pathway.

The research pursues three specific objectives:

1. To identify barriers and facilitators to the adoption of video-based teleconsultations at ULS Algarve.

2. To explore stakeholders' perceptions and experiences regarding teleconsultation implementation.
3. To define practical recommendations and implementation requirements to support phased and equitable adoption.

To achieve these objectives, a qualitative, exploratory, and participatory study was conducted, based on semi-structured interviews with diverse stakeholders from primary and hospital care. The methodological approach follows the initial phase of the Participatory Design (PD) framework—the Needs Assessment phase—which focuses on understanding user and organisational perspectives to inform the co-creation of feasible and sustainable solutions.

In addition to generating scientific evidence, this research addresses a critical gap in understanding regional variation in digital health adoption. The results have immediate practical relevance for reducing innovation disparities and for informing implementation strategies to support the sustainable adoption of teleconsultations tailored to the specific context of ULS Algarve.

This thesis is organised into six chapters. Following the Introduction, Chapter 1 presents the contextual framework. Chapter 2 reviews the literature on digital health and teleconsultation implementation. Chapter 3 outlines the theoretical and conceptual analytical framework (CFIR and Participatory Design). Chapter 4 details the methodology. Chapter 5 reports the research results. Chapter 6 discusses the findings in relation to the literature and derives practical implications. The thesis concludes with a Conclusion section.

Author's note on AI use:

Artificial intelligence tools were used exclusively for language revision and structural clarification of the manuscript. All substantive content, data interpretation and analysis were produced by the author. AI-generated content was verified and edited prior to inclusion, in accordance with the ManagiDiTH Thesis Handbook guidelines.

Chapter 1. Contextual framework

Digital transformation in healthcare has given rise to a set of interrelated concepts that require a clear distinction. eHealth is the broad term referring to the use of information and communication technologies (ICT) to support health promotion, management, and education (PENTS, 2019). Telehealth encompasses remote health-related services delivered by professionals for care provision, service organisation, or training. Telemedicine is a subset of telehealth focused on clinical care delivered at a distance via channels such as video, messaging, or telephone (European Commission, 2008; WHO, 2020), including teleconsultations, which gained prominence during and after the COVID-19 pandemic (Magalhães et al., 2022; ERS, 2022; SPMS, 2024). In this thesis, "video-based teleconsultations" refer to synchronous clinical encounters conducted via video-conferencing platforms within the Portuguese National Health Service (SNS) (e.g. PDS Live), distinct from telephone-only contacts.

In Portugal, digital transformation aligns with the European Union's Digital Decade 2030 strategy, which promotes secure and interoperable digital health services for all citizens. The European Health Data Space is a central initiative supporting data sharing for care and research (European Commission, 2022). Portugal has translated these European priorities into national digital health strategies and maturity targets.

National telehealth development is guided by the National Strategic Plan for Telehealth (PENTS 2019–2022), developed by the Shared Services of the Ministry of Health (SPMS) and the National Telehealth Commission. It defines strategic priorities for innovation, care integration, and ICT adoption within the National Health Service. These objectives are reinforced by legislative measures such as Ministerial Order (Despacho) No. 3571/2013 and Ministerial Order (Despacho) No. 3204/2023, which promote and incentivise teleconsultations (Ministry of Health, 2013, 2023).

The expansion of telehealth addresses structural challenges facing the National Health Service, including population ageing, chronic disease, workforce shortages, and regional inequalities (ERS, 2022; WHO, 2020). Within this context, teleconsultations are a key strategy for improving accessibility, quality, and continuity of care.

SPMS leads Portugal's digital health infrastructure, supporting platforms such as SClínico, PDS Live, and RSE Live. Its initiatives include training and technical support for teleconsultation services, with performance data indicating substantial growth in the use of the LIVE platform (SPMS, 2024).

Despite this national growth, regional disparities remain evident. In the SNS Transparency Portal dataset reporting telemedicine consultations by region, Lisbon and Tagus Valley recorded approximately 170,000 first telemedicine consultations in 2024, whereas the Algarve shows no recorded activity (zero or missing values) through November 2024, with the first non-zero records appearing only in December (180 first consultations) (SNS Transparency Portal, n.d.-b). These are administrative figures reported under the label telemedicine and do not specify modality at the regional level (e.g., video-based vs telephone); nevertheless, the magnitude of the regional contrast underscores the risk that digital transformation may exacerbate territorial inequalities when implementation capacity differs across contexts, consistent with European evidence (Van Kessel et al., 2022).

The Algarve case is particularly relevant following its organisational restructuring through Decree-Law No. 102/2023, which integrated hospitals and primary care centres into a single Local Health Unit (Portuguese Republic, 2023). ULS Algarve serves approximately 450,000 residents across 16 municipalities, a number that can increase substantially during peak tourist seasons (ULS Algarve, n.d.; Executive Digest, 2024).

These demographic and structural characteristics, combined with the absence of recorded regional activity in the portal dataset, make ULS Algarve a relevant case for understanding the gap between digital potential and its practical implementation.

In summary, this chapter defines the key concepts and policy context of digital health in Portugal and introduces the specific case of ULS Algarve. The next chapter reviews the literature to identify barriers, facilitators, and needs influencing teleconsultation adoption.

Chapter 2. Literature review

This chapter synthesises academic and policy evidence to frame the implementation problem addressed in this thesis: why routine video-based teleconsultations remain limited in the ULS Algarve despite national progress in digital health. The review is organised thematically to connect macro-level policy and digital maturity agendas with meso-level and micro-level determinants of implementation in real-world healthcare settings. Following Snyder's guidance for thematic literature reviews, evidence is clustered into conceptual categories to enable interpretation rather than a descriptive listing of studies (Snyder, 2019).

A targeted literature search was performed in PubMed, Scopus, and Web of Science, supplemented by key institutional sources (WHO, European Commission, OECD, ERS, and SPMS). Search terms included: "digital health" OR "eHealth" OR "telehealth" OR "telemedicine" OR "teleconsultation" AND "implementation" OR "adoption" OR "barriers" OR "facilitators" AND ("primary care" OR "hospital" OR "public health system"). The review focused on publications in English and Portuguese from 2020 to 2025 and on seminal references needed to define core concepts and policy milestones. Preference was given to systematic reviews, implementation-focused qualitative studies, and high-quality policy reports relevant to European public systems.

The review is structured into three axes: (i) digital health developments and policy frameworks (European and Portuguese); (ii) telehealth/teleconsultation implementation evidence, including benefits and adoption patterns; and (iii) barriers and implementation challenges across technological, organisational, professional, and patient-related dimensions. These axes underpin the analytical framework (CFIR + Participatory Design) and the empirical investigation presented in subsequent chapters.

2.1 Digital health developments and policy frameworks

The concept of eHealth emerged in the early 2000s as an extension of medical informatics and the use of the Internet in health, as an early step towards the digitalisation of health systems (Duplaga, 2007). In the following decade, the concept expanded to digital health, incorporating technologies such as artificial intelligence (AI), big data, the Internet of Things (IoT), and robotics, which were applied to address structural problems in delivery systems and to improve care (Domenichiello, 2015). This transition reflects the consolidation of a new paradigm – digital-in-health – that understands technology and data not as auxiliary components but as central infrastructures for organising health services and governance (World Bank, 2023).

The digital paradigm in health has been recognised as an important vector for reducing inequalities, improving access, increasing efficiency and strengthening the resilience of health systems. At the same time, it enhances professionals' digital literacy, promotes care integration, and strengthens the capacity to respond to global challenges such as demographic ageing and climate change (World Bank, 2023).

2.1.1 European Developments and Policy Frameworks

In Europe, this development has been accompanied by large-scale political and strategic action. Since the first European Union eHealth policies, the trajectory has increasingly focused on building integrated digital ecosystems grounded in interoperability, data protection, and emerging technologies (Essén et al., 2022). A recent milestone is the European Commission's proposal for the European Health Data Space (EHDS), presented in 2022, which aims to strengthen citizens' secure access to electronic health data and enable the secondary use of data for research, innovation, and public policymaking (European Commission, 2022; European Commission, 2024b).

The EHDS aligns with the Digital Decade 2030 programme, which sets targets for digital public services, including health-related goals such as interoperability, wider electronic health record coverage, and secure cross-border data use (European Commission, 2024b). In 2025, the Digital Decade eHealth Indicator Study reported that the average digital maturity of health systems across EU Member States reached 83% in 2024, with Portugal increasing from 63% in 2022 to 86% in 2023, ranking among the countries with the highest growth (European Commission, 2025).

Despite this progress, implementation disparities persist across countries and regions. Research indicates that the translation of European policies into national strategies remains shaped by social, technological, regulatory, and organisational barriers that hinder harmonisation and equitable access (Currie & Seddon, 2014; Faxvaag et al., 2024; Bruthans, 2024). These barriers often reflect tensions between EU-level direction and Member States' decentralised adaptations, especially in areas such as interoperability, evaluation, and reimbursement of digital technologies (Tarricone et al., 2024; Riedel et al., 2024; Bérut, 2024).

Furthermore, European contexts still face structural and legal gaps in system integration and data sharing (Faxvaag et al., 2024). The study by Fernandes et al. (2024), which covers 44 countries in the WHO European Region, reveals that 83% of these countries already have national digital health strategies, with a strong emphasis on governance, equity and citizen empowerment. Still,

implementation varies widely depending on governance models, institutional capacities, and population digital literacy.

In addition, recent comparative analyses of legal, ethical and financial issues in the implementation of digital health show persistent fragmentation across Member States and uneven progress in harmonising standards (Bente et al., 2024; OECD, 2022). This fragmentation threatens European digital cohesion and limits the potential of initiatives such as the EHDS to create a common, inclusive data space (Bruthans, 2024).

These European developments provide the overarching framework for national digital health strategies, such as Portugal's.

2.1.2 National Developments

In Portugal, SPMS has led the digitalisation of the National Health System through structuring projects. The National Strategic Plan for Telehealth 2019–2022 reinforced these aims, prioritising the integration of care, digital accessibility, and territorial equity (SPMS, 2019).

Progress is visible in Portugal's digital maturity, which has reached an "emerging–advanced" level, although key Digital Decade 2030 goals have not yet been fully achieved. European reports continue to identify gaps in interoperability, digital literacy, and territorial equity (European Commission, 2024a; Publications Office of the EU, 2023; WHO Regional Office for Europe, 2024).

Administrative indicators from the National Health Service Transparency Portal show no recorded regional activity for the Algarve up to November 2024 in the dataset reporting telemedicine consultations by region, in contrast to other regions where activity is reported (SNS Transparency Portal, n.d.-b). At the same time, national-level aggregates from the LIVE platform indicate marked growth in teleconsultations, suggesting substantial uptake nationwide.

Differences in conceptual scope (what is counted as "telemedicine" versus platform-enabled teleconsultations) and data granularity (regional administrative indicators versus national aggregates) limit regional comparability and constrain the transparent assessment of the implementation of video-based teleconsultation in the Algarve context. This gap reinforces the need for local strategic planning and for a standardised set of metrics aligned with European guidance on digital maturity and equity, particularly to monitor and reduce access disparities.

This information highlights the need for strategic planning with a future-oriented vision and strategies adapted to the local context. Crucially, it requires rigorous operationalisation of concepts

(telemedicine vs teleconsultation; synchronous vs asynchronous; video vs telephone), without which indicators lose validity, regional benchmarking becomes biased, and digital governance lacks a solid basis for decisions that promote maturity and equity.

In summary, the evolution of digital health in Europe and Portugal has been supported by structured policies, regulations, and investment in technology. However, political and technical fragmentation, implementation asymmetry, and governance gaps continue to challenge fairness and sustainability. Understanding these dynamics is essential to guide coherent, secure, and citizen-centred digital transition strategies, particularly in regional contexts where telehealth adoption remains limited.

2.2 Implementation of Telehealth and Teleconsultation

The successful implementation of telehealth depends not only on technological progress but also on its integration into health systems and clinical practice. Following the consolidation of digital health strategies across Europe and Portugal, it becomes essential to understand how telemedicine services, particularly teleconsultations, have been developed and adopted. This section examines the key concepts and evidence on telehealth and teleconsultation, outlining their scope, benefits, and adoption patterns, as a foundation for analysing the barriers and opportunities discussed in the next section.

2.2.1 Concept and Scope

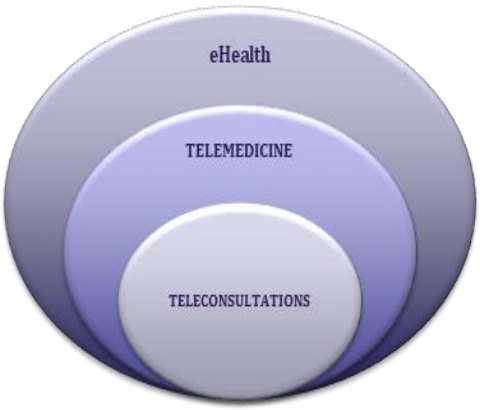


Figure 2.1. Telehealth as an umbrella concept: telemedicine and teleconsultations
Note. Author-created figure, based on concepts described in WHO (2020) and European Commission (2008).

Telehealth and telemedicine are sometimes used interchangeably in practice; however, conceptually, telehealth is the broader umbrella term, whereas telemedicine refers specifically to clinical services delivered at a distance via ICT (European Commission, 2008; WHO, 2020). As illustrated

in Figure 2.1, telemedicine is a subset of telehealth, and teleconsultations constitute a core telemedicine service modality. In this thesis, teleconsultation is treated as a telemedicine modality; the empirical focus is synchronous video-based teleconsultations within SNS.

2.2.2 Benefits, Growth and Adoption

Telemedicine is widely described as an innovative service that can complement face-to-face practice and support improved accessibility and equity in healthcare. It may contribute to improved access to care by connecting rural, remote, or marginalised populations with specialists in urban centres, thereby reducing geographical barriers and supporting more person-centred care. In addition, telemedicine interventions can incorporate translation tools and culturally adapted content, potentially benefiting diverse populations. International evidence suggests that telemedicine—including teleconsultations—may generate efficiency gains and reduce operating costs in some settings (World Bank, 2023).

Another frequently reported benefit concerns quality and continuity of care. Telemedicine can support the monitoring of chronic conditions by enabling timely feedback and integrating face-to-face and remote contacts into coordinated care pathways. Li et al. (2025) underline that telemedicine can strengthen chronic care monitoring through continuous feedback, multidisciplinary coordination, and data-informed decision-making.

Teleconsultations have also shown measurable efficiency outcomes. Capodici et al. (2025), in a systematic review involving over 270,000 patients, reported reductions in outpatient waiting times (on average, 25 days), particularly in medical specialities, improving access and system responsiveness. These advantages contributed to the rapid expansion of telemedicine services worldwide.

The COVID-19 pandemic accelerated global and European adoption of telemedicine, confirming its role in maintaining continuity of care and strengthening health system resilience (World Bank, 2023; Paleari et al., 2022). In response, European initiatives increasingly encourage the integration of telehealth and hybrid care models to enhance interoperability and improve access across regions (European Commission, 2025; EIT Health, 2024).

In Portugal, available indicators confirm a growth trend. ERS reported sharp increases in teleconsultations in 2020 and 2021, and SPMS reported substantial growth in the use of the LIVE platform (ERS, 2022; SPMS, 2024). From patients' perspectives, satisfaction with teleconsultations is consistently high across care settings. Studies highlight convenience, accessibility, and perceived continuity as key advantages. In acute care, Isautier et al. (2022) found broadly positive experiences,

while Almathami et al. (2024) reported satisfaction rates above 85% in primary care, largely attributed to easier access, continuity, and reduced travel.

Similarly, O'Neill et al. (2022) reported positive perceptions in Portugal's National Health Service (SNS), with users often describing teleconsultation quality as comparable to face-to-face visits. However, the authors also highlight structural and organisational constraints that can limit territorial equity in telemedicine adoption.

Overall, while the literature supports teleconsultations as a valuable modality for selected clinical scenarios, it also shows that adoption and sustainability depend on addressing multi-level implementation barriers, from infrastructure and interoperability to workflows, training, governance, and equity safeguards. This reinforces the need to analyse barriers and challenges in the literature and to consider stakeholder-centred approaches to specify actionable requirements for implementation in local contexts such as ULS Algarve.

2.3 Barriers and challenges to the implementation of telehealth

The exponential increase in telehealth use, especially since COVID-19, has revealed both its transformative potential and its structural limitations. Although telehealth was widely deployed to maintain continuity of care during periods of physical restriction, the literature consistently shows that sustained implementation requires more than rapid adoption. Despite confirmed benefits, multiple system weaknesses and obstacles to long-term integration have been identified (Nascimento et al., 2023; Rettinger & Kuhn, 2023).

Gullslett et al. (2024), drawing on the 2022 WHO survey, similarly report that availability and readiness for telehealth remain insufficient for sustained use and highlight regional differences and barriers that must be addressed.

Across reviews and empirical studies, barriers are commonly grouped into four interrelated dimensions: technological, organisational, professional, and patient-related (Khoshrounejad et al., 2021; Lieneck et al., 2021; Rettinger & Kuhn, 2023). These dimensions interact: limitations in one area (e.g., infrastructure) often amplify constraints in others (e.g., workflow integration, professional confidence, or equity of access).

a) Technological barriers

Technological infrastructure is a prerequisite for telehealth and a core determinant of feasibility. Connectivity and network coverage are among the most frequently reported obstacles, particularly in

rural and less developed areas (Rettinger & Kuhn, 2023; Gullslett et al., 2024). Saigí-Rubió et al. (2022) also note that disparities in internet coverage across WHO Europe Member States undermine the equity and effectiveness of digital services.

Limited availability of appropriate equipment is another critical constraint. Without reliable computers, cameras, audio devices, and configured workstations, telehealth cannot be implemented consistently even when network coverage is adequate (Khoshrounejad et al., 2021).

Interoperability gaps further disrupt continuity of clinical information and increase administrative burden, reducing efficiency and discouraging routine use. Usability and reliability problems in platforms can reduce trust among professionals and patients, compounded by concerns about security, privacy, and the quality of remotely collected data (Monda et al., 2020; Rettinger & Kuhn, 2023; Tabibzadeh & Tran, 2022).

Studies also propose mitigation strategies, including investment in infrastructure and connectivity, adoption of interoperable standards (e.g., HL7/FHIR), and user-centred platform design. Khoshrounejad et al. (2021) explicitly advocate participatory and user-centred design approaches to improve usability and trust, while Alazab et al. (2023) emphasise continuous feedback and multidisciplinary collaboration—principles aligned with Participatory Design in health.

Synthesis: Technological barriers are not limited to “lack of internet”; they include equipment availability, configuration, interoperability, and user trust. Without these foundations, telehealth remains fragile and difficult to scale equitably.

b) Organisational barriers

Organisational readiness and the ability to integrate telehealth into clinical workflows are crucial for sustainability. The absence of clear protocols and clinical guidelines for remote consultations is widely reported and can compromise quality of care and professionals’ confidence (Lieneck et al., 2021). Rapid implementation during the pandemic has also contributed, in some settings, to system fragmentation and record duplication, negatively affecting efficiency (Monda et al., 2020).

Workflow integration challenges are particularly visible in video consultations. Greenhalgh et al. (2022) show that clinical uncertainty, limited workflow fit, and lack of guidance contribute to low routine use of video consultations and undermine practitioner confidence. Bente et al. (2024) similarly highlight organisational readiness and governance clarity as determinants for implementing teleconsultations.

Other frequently cited barriers include uncertainty about financing and reimbursement models, which can hinder institutional investment and continuity beyond emergency contexts (Alazab et al., 2023; Alami, 2023). Lack of leadership and structured change management can further constrain team engagement. Regulatory issues—including licensing, professional liability, and quality oversight—also pose obstacles, particularly for cross-border telehealth (Tabibzadeh & Tran, 2022; Khoshrounejad et al., 2021).

Mitigation strategies include developing standardised guidelines, integrating information systems with teleconsultation platforms, and designing value-aligned payment models that support continuity and fair cost–benefit distribution among stakeholders (Lieneck et al., 2021; Alami, 2023).

Synthesis: Organisational barriers consistently point to “last-mile” operationalisation problems—protocols, workflow fit, governance, reimbursement, and leadership. These barriers explain why telehealth can expand quickly under pressure yet fail to become routine without structured planning.

c) Professional barriers

Health professionals’ acceptance and digital competence are central to successful implementation. Insufficient digital literacy and limited technical training remain common barriers, particularly among staff with less technological familiarity (Nascimento et al., 2023; Rettinger & Kuhn, 2023).

Professionals also report clinical insecurity linked to reduced physical examination and a perceived loss of control over diagnostic processes (Tabibzadeh & Tran, 2022). Increased administrative burden, parallel documentation, and dependence on technical support can generate resistance and increase the risk of burnout (Khoshrounejad et al., 2021).

Effective strategies described in the literature include continuing education programmes, mentoring networks, and responsive technical support integrated into daily practice (Lieneck et al., 2021; Alazab et al., 2023). The importance of dedicated ICT support and digital facilitators is also reinforced in empirical work (Wherton et al., 2022) and in WHO implementation guidance (WHO, 2022).

Synthesis: Professional barriers combine capability (skills/training) and confidence (clinical risk perception), amplified by workload and support constraints. Addressing these determinants requires practical training, operational support, and workflow designs that reduce friction rather than adding tasks.

d) Patient-related barriers

On the user side, digital access remains a major determinant of equity. Limited internet access, lack of appropriate devices, and lower digital literacy disproportionately affect older adults, rural communities, and low-income groups (Sagaro et al., 2020). Concerns persist regarding the perceived quality of remote care, reduced relational aspects of face-to-face encounters, and confidentiality of personal data (Rohowsky et al., 2023).

Variation in patient acceptance and sustained use is associated with demographic and cultural factors that influence perceived value and the continuity of engagement. Commonly proposed enablers include digital literacy support, device-lending initiatives, caregiver involvement, and culturally sensitive and accessible platform design (Sagaro et al., 2020; Nittas et al., 2024; WHO, 2022).

Synthesis: Patient-related barriers indicate that telehealth can unintentionally widen inequalities unless equity safeguards are embedded (e.g., access, support, and inclusive design). Implementation must therefore include alternatives and support pathways for digitally excluded groups.

Overall synthesis and relevance to this thesis

Across the reviewed literature, the central challenge is the transition from emergency-driven telehealth expansion to routine, safe, and equitable service delivery. Persistent barriers—especially those related to workflow integration, infrastructure, training, governance, and equity—help explain why teleconsultations may remain sporadic rather than becoming embedded as standard practice. In Portugal, similar issues have been reported, including technological constraints, interoperability problems, and regional inequalities (O'Neill et al., 2022).

Understanding these multidimensional barriers is essential to guide context-sensitive interventions and inform the next phase of this research, which applies stakeholder-centred Participatory Design methods to identify actionable implementation requirements for sustainable video-based teleconsultations in ULS Algarve.

Chapter 3. Theoretical and conceptual analytical framework

This chapter presents the theoretical and conceptual analytical framework that underpins the study. It defines the core concepts (teleconsultation and synchronous video-based care) and introduces the implementation and service design lenses used to interpret the limited routine use of teleconsultations in ULS Algarve, thereby guiding data collection and subsequent thematic analysis.

Teleconsultation is defined, following SPMS (2019) and WHO (2020), as a clinical encounter delivered at a distance through information and communication technologies to assess a person's condition and plan care. While teleconsultations may occur synchronously or asynchronously, this study focuses on synchronous, video-based encounters because they represent the closest functional equivalent to face-to-face consultations. They require real-time interaction, immediate clinical decision-making, and coordination across stakeholders. In addition, the analysis prioritises delivery through the Portuguese National Health Service (SNS) platform LIVE (PDS Live), as this is the institutional channel expected to support governance, standardisation, integration with routine workflows, and compliance with security and data protection requirements.

For analytical clarity, barriers are obstacles that hinder adoption (technological, organisational, professional, and patient-related), needs are the conditions and resources required for practical use, and opportunities are the benefits and potentials arising from implementation. This categorisation is grounded in the literature (e.g., Gullslett et al., 2024; Khoshrounejad et al., 2021; Lieneck et al., 2021; Rettinger & Kuhn, 2023).

Understanding adoption also requires distinguishing internal and external determinants. As proposed by Damschroder et al. (2009), technological change in healthcare emerges from interactions between the inner setting (resources, skills, workflows, leadership, and culture) and the outer setting (policy, funding, and socio-economic factors). This distinction supports a comprehensive analysis of the conditions that enable or constrain the implementation of teleconsultation in the ULS Algarve.

Stakeholders' perceptions directly influence the acceptance, use, and sustainability of a technology. In diffusion terms, adoption depends on perceived relative advantage and compatibility (Rogers, 1983). In technology-acceptance terms, perceived usefulness and perceived ease of use are key drivers (Davis, 1989). These determinants are integrated in the Unified Theory of Acceptance and Use of Technology (UTAUT) as performance expectancy, effort expectancy, social influence, and facilitating conditions, moderated by age, gender, experience, and voluntariness of use (Venkatesh et al., 2003).

From an implementation science perspective, acceptance and adoption are implementation outcomes distinct from service or clinical outcomes, capturing the initial decision and early use in real-world settings (Proctor et al., 2011). Evidence also suggests that trust functions as an enabling and mediating factor linking individual perceptions to usage behaviour in digital health (e.g., Wissawaswaengsuk et al., 2025). Hence, beliefs, performance expectations, and trust relationships are central to this study's objective of exploring stakeholders' experiences and perspectives regarding teleconsultation implementation.

In this field, sustainability is defined as the extent to which an implemented intervention is maintained or institutionalised within routine operations (Proctor et al., 2011). For ULS Algarve, this implies the continuous and adaptive integration of teleconsultations to preserve effectiveness, relevance, and acceptance over time. In virtual care, definitions converge on continued use and sustained benefits, contingent on the dynamic fit between organisational, technological, and human factors. In practice, sustainable implementation typically requires ongoing training, robust infrastructure, responsive technical support, stakeholder engagement, and monitoring and feedback mechanisms that allow adaptation without loss of effectiveness (Austin et al., 2025).

Once the concepts of this study (teleconsultations, internal and external determinants, barriers, and sustainability) have been defined, the analysis of the factors that explain limited routine use and shape potential adoption can be enriched through two complementary approaches: Participatory Design (PD) and the Consolidated Framework for Implementation Research (CFIR).

a) Participatory Design (PD)

The limited routine use of teleconsultations in local health units may reflect insufficient practical involvement of key actors in the development and implementation of digital solutions. This gap can result in tools misaligned with real needs and constraints in the context of use. PD therefore emerges as a relevant methodological approach by promoting active and equitable involvement of researchers, health professionals, and citizens in the design of technologies and services.

Core PD principles include horizontal collaboration, mutual learning, power-sharing in decision-making, and iteration between design, testing, and redesign. Unlike traditional development methods, PD does not propose solutions for users; it develops solutions with users (Interaction Design Foundation, 2022).

The literature underscores that collaborative, interactive, and contextually grounded processes can strengthen ownership, appropriateness, and adaptation to local realities, supporting cycles of

reflection and continuous improvement. PD also recognises digital transformation as a complex socio-technical phenomenon characterised by non-linear dynamics and co-creation of knowledge, mediated by systematic feedback from those involved (Clemesen, 2025; Azevedo, 2025).

Evidence from systematic reviews suggests that stakeholder participation from early stages can support inclusion and reduce inequities, contributing to more inclusive innovations (Wacnik, Daly, & Verma, 2024). Applied studies also report the usefulness of participatory approaches in co-creating electronic health record components and developing technologies for older adults, with improvements in usability and acceptance (Robert et al., 2025; Sienkiewicz et al., 2024; Capodici et al., 2024).

PD is commonly described as an iterative process involving context exploration, collaborative ideation, prototyping, and joint evaluation. In this study, Phase 1 – Needs Assessment informs the identification of perceptions, expectations, and needs among health professionals, managers, and users, supporting the specification of local barriers, needs, and opportunities for adoption.

Overall, PD enables the study to move beyond a descriptive account of barriers by supporting the formulation of context-sensitive and socially acceptable implementation requirements that can inform future co-design and implementation planning.

b) Consolidated Framework for Implementation Research (CFIR)

CFIR was developed by Damschroder et al. (2009) and refined in later work (Damschroder et al., 2022; Kirk et al., 2016; Safaeinili et al., 2019). It is one of the most widely used frameworks in implementation science to systematically identify determinants influencing whether innovations are adopted and integrated into routine practice. CFIR supports structured analysis across multiple levels, including the intervention, individuals, organisations, and the wider system.

CFIR is organised into five interrelated domains:

- Intervention Characteristics: features of the innovation, such as complexity, adaptability, relative advantage, and strength of evidence.
- Inner Setting: organisational conditions, including culture, communication, leadership engagement, available resources, and implementation climate.
- Outer Setting: external influences such as policy, regulation, financing, incentives, and patient/community needs.

- Characteristics of Individuals: knowledge, beliefs, self-efficacy, and values of those involved in adoption and use.
- Process: activities shaping implementation, including planning, stakeholder engagement, role clarification, workflow design, and anticipated monitoring and evaluation needs.

Recent work indicates that CFIR is useful for analysing digital health interventions, including telehealth, because sustainable adoption depends not only on technical performance but also on organisational alignment, leadership support, training, and perceived value for professionals and users (Damschroder et al., 2022; Safaeinili et al., 2019). Because routine video-based teleconsultations were not established at ULS Algarve, this study uses CFIR to assess barriers and enablers related to organisational readiness and adoption conditions. Accordingly, the process domain is interpreted through participants' descriptions of planning and operational requirements, rather than as observed implementation stages. CFIR therefore provides the analytical structure for interpreting interview data and mapping how organisational resources, culture, policies, and stakeholder engagement shape feasibility.

The integration of PD and CFIR provides a coherent theoretical–methodological approach. PD emphasises co-creation and stakeholder involvement in developing context-appropriate solutions, whereas CFIR provides a structured lens to identify determinants of implementation feasibility. Together, these frameworks support a holistic understanding of adoption and sustainability by addressing human, organisational, and system-level factors relevant to implementation (Damschroder et al., 2022; Safaeinili et al., 2019; Bergström et al., 2020).

As noted by Nilsen (2015), relying on a single framework may limit the analysis of complex change processes in real-world settings. Combining complementary frameworks can therefore support richer interpretation of conditions under which innovations may be adopted, adapted, and sustained.

In this study, integrating PD and CFIR supports: identifying stakeholders' needs, expectations, and concerns; mapping inner- and outer-setting determinants influencing adoption; synthesising practical requirements for context-sensitive implementation planning; and formulating realistic, evidence-informed recommendations for ULS Algarve. This dual-framework approach provides the conceptual foundation for the methodological design presented in the following chapter and aligns directly with the study objectives: CFIR supports the identification of barriers and enablers, while PD supports the exploration of stakeholder perspectives and co-synthesis of practical recommendations.

Table 3.1. PD–CFIR integration points and links to study objectives

PD + CFIR Integration Point	**Direct relationship with study objectives**
Identify local needs, expectations, and concerns through stakeholder involvement (Participatory Design)	Objective 2 (stakeholder perceptions/experiences and needs) and Objective 3 (requirements)
Map barriers and enablers influencing adoption (Consolidated Framework for Implementation Research)	Objective 1 (barriers/enablers)
Synthesise findings into context-sensitive implementation requirements (Participatory Design + Consolidated Framework for Implementation Research)	Objective 3 (requirements)
Formulate practical recommendations to support feasible and equitable adoption	Objective 3 (recommendations) and synthesis of Objectives 1–2

Chapter 4. Methodology

This study adopted a qualitative exploratory case study design, appropriate for investigating complex, context-specific phenomena in healthcare and for generating implementation-relevant insights in real-world settings (Creswell & Poth, 2018; Yin, 2018). The case study focused on ULS Algarve and enabled an in-depth examination of organisational conditions associated with the lack of routine video-based teleconsultations, and their relationship with national policies and digital health initiatives (Yin, 2018).

Analytically, the study followed an interpretive approach, valuing participants' perspectives and the contextual construction of meaning during interviews (Creswell & Poth, 2018). Data were analysed thematically using a hybrid strategy informed by implementation science and Participatory Design (PD) principles for Needs Assessment. This approach prioritised depth of understanding and practical relevance without claiming a phenomenological design or applying a phenomenological analytical procedure. This positioning ensured methodological coherence with the study's aims (mapping barriers, needs, and opportunities) and with the selected analytical frameworks, while maintaining sensitivity to the experiential dimension reported by professionals, managers, ICT staff, patients, and caregivers. Finally, the participatory dimension was anchored in PD and applied in its first phase, the Needs Assessment.

CFIR and Participatory Design were applied as complementary frameworks with distinct roles. CFIR was used as a determinants framework to sensitise coding and structure the interpretation of barriers and enablers influencing readiness and adoption conditions for video-based teleconsultations. Participatory Design was applied at the Needs Assessment stage by engaging diverse stakeholders through semi-structured interviews to elicit needs, concerns, and opportunities. Due to the scope of the thesis and organisational constraints, later PD stages (co-design workshops, prototyping, and iterative testing) were not conducted; instead, interview insights were synthesised to inform future co-creation and implementation planning. Not all CFIR constructs were expected to emerge, and emphasis was placed on those most salient to participants' accounts. Table 4.1 summarises how each objective was operationalised, including evidence sources, analytical lens, and expected outputs.

Table 4.1. Mapping of objectives, evidence sources, analytical lens, and outputs (CFIR + PD Needs Assessment)

Specific Objective	CFIR Domain / Construct	Participatory Design Phase 1 – Needs Assessment (Activity)	Example Interview Focus	Expected Output	A priori Codes (CFIR-based)
1. Identify organisational barriers and facilitators influencing the adoption of video-based teleconsultations at ULS Algarve.	Inner Setting – culture, leadership engagement, available resources, readiness for implementation. Outer Setting – policies, incentives, population needs.	Context mapping through stakeholder interviews to identify structural enablers and barriers.	What organisational or external factors facilitate or hinder video-based teleconsultations? How do leadership, resources, and workflows affect readiness?	Map of barriers and facilitators; prioritised list of enabling conditions.	Leadership engagement; available resources; workflow compatibility; policy alignment; readiness for implementation
2. Explore stakeholders' perceptions and needs related to the adoption and use of video-based teleconsultations.	Characteristics of Individuals – knowledge, beliefs, self-efficacy, perceived value. Process – stakeholder engagement needs (planning requirement).	Exploration of expectations, concerns, and perceived suitability through semi-structured interviews, ensuring balanced representation.	How do professionals, managers, and patients/caregivers perceive video-based teleconsultations? What factors shape willingness and confidence to use them?	Thematic synthesis of perceptions and needs; identification of trust, acceptability, and capability factors.	perceived usefulness; trust; digital literacy; self-efficacy; willingness to use
3. Identify context-specific needs and opportunities to inform future implementation planning.	Process – planning and anticipated monitoring/evaluation needs. Intervention Characteristics – adaptability, complexity, relative advantage.	Stakeholder-informed synthesis of interview insights to identify local needs and feasible opportunities.	What supports are needed for feasible and equitable adoption? Which actions would make implementation viable in this context?	Actionable recommendations and minimum implementation requirements tailored to ULS Algarve.	training needs; infrastructure support; patient accessibility; workflow design; sustainability requirements

4.1 Context and Geographical Delimitation: Barlavento Region

The ULS Algarve provides integrated healthcare across the 16 municipalities of the Algarve region, serving approximately 484,000 residents—a number that can triple during the tourist season. It ensures access to primary, hospital, continuous, and palliative care through three hospitals (Faro, Portimão, and Lagos), 16 health centres, and approximately 100 community extensions, employing about 7,000 professionals (ULS Algarve, n.d.).

Despite its large scale and strategic mission to integrate care and promote equity, ULS Algarve faces persistent structural constraints, including workforce shortages and lower per capita funding than other Portuguese health units. These challenges contribute to the slow adoption of innovative services such as teleconsultations.

This study focused on the Western Algarve (Barlavento), including the municipalities of Aljezur, Vila do Bispo, Lagos, Monchique, Portimão, Lagoa, Silves, and Albufeira, with a resident population of about 200,000 (Instituto Nacional de Estatística, 2024). The area is served by the Barlavento Primary Health Care cluster and the hospitals of Portimão and Lagos.

The choice of this area was based on two reasons: (1) it represents the diversity of care contexts within the region, including both primary and hospital settings; and (2) it ensured methodological feasibility within the study timeframe.

Accordingly, this research adopted a single-case study design with integrated units of analysis, covering primary care and hospital outpatient care in the Barlavento region. This geographical delimitation provided sufficient analytical depth and contextual relevance to identify organisational barriers and opportunities for implementing teleconsultations within ULS Algarve.

4.2 Participants

Participants were drawn from the Barlavento area of ULS Algarve, encompassing both Primary Health Care (PHC) units and hospital outpatient services in Portimão and Lagos. A purposive sampling strategy was employed to achieve diversity of roles and experiences relevant to the research question while ensuring operational feasibility (Creswell & Poth, 2018; Patton, 2015).

Participants were purposively selected to ensure diversity of professional roles, care settings, and user perspectives relevant to the research question. The final sample included healthcare professionals

from primary and hospital care, middle managers, ICT professionals, and patients and caregivers who had recently contacted ULS Algarve services.

Four stakeholder groups were included:

- Healthcare professionals (physicians and nurses) from PHC and hospital settings.
- Middle managers, such as service heads, coordinators, or operational supervisors.
- ICT professionals involved in system implementation or digital support.
- Users and caregivers who had used ULS Algarve services in the last 12 months.

Inclusion and exclusion criteria

- Participants were adults (≥18 years), had functional communication in Portuguese, were available for an interview (face-to-face or online), and provided signed informed consent.
- For users and caregivers, eligibility required at least one recent contact with ULS Algarve services and a stable clinical condition.
- Professionals were currently employed at ULS Algarve and had at least 6 months' experience.

Exclusion criteria included inability to provide consent, acute distress, a direct care relationship with the investigator, language barriers, refusal to be recorded, or withdrawal.

Sample size and saturation: 19 interviews were conducted across subgroups to ensure maximum variation. Recruitment of users and caregivers was gatekeeper-assisted, using a screening checklist and a permission-to-contact form (Annex A). Participant demographic and role-related information was collected using a standardised sample characterisation form to support transparent reporting and pseudonymised participant description (Annex E).

Table 4.2. Characteristics of interview participants

Participant group	n	Age range (years)	Care context	Professional experience (years)	Main characteristics
Primary Health Care professionals (physicians and nurses)	3	36–≥65	PHC (Barlavento)	21–42	Direct involvement in outpatient care; prior experience with telephone consultations
Hospital outpatient professionals (physicians and nurses)	9	36–55	Hospital (Portimão/Lagos)	11–45	Involved in follow-up and ambulatory consultations
Managers/coordinators	3	36–65	PHC and Hospital	11–38	Responsibilities in service organisation and workflow planning
ICT professionals	1	—	ULS Algarve	—	Involved in digital systems implementation and support
Patients and caregivers	3	36–≥65	PHC and Hospital users	—	Recent contact with ULS Algarve services; heterogeneous digital literacy
Total	**19**	—	—	—	—

Note: Age and professional experience are presented as minimum–maximum ranges within each participant group to ensure anonymity and reflect sample heterogeneity.

Data collection continued until sufficient depth of information was achieved across stakeholder groups to support a coherent interpretation of barriers, needs, and implementation requirements. Given the small size of some stakeholder subgroups (e.g., ICT; users/caregivers), the study does not claim saturation within each subgroup; rather, it prioritised maximising variation and convergence of themes across roles and care levels.

Strategies to ensure rigour

- Maximum variation sampling across stakeholder categories.
- Triangulation of perspectives (PHC, hospital, management, ICT, users/caregivers).

This approach supported credibility, diversity, and analytical depth, consistent with qualitative research principles and aligned with the CFIR and PD frameworks guiding the study.

4.3 Data collection techniques and tools

Data were collected through semi-structured interviews. This method is appropriate for exploratory-descriptive qualitative research, as it enables an in-depth understanding of stakeholders' perceptions, needs, and experiences while allowing flexibility to explore new themes that emerge during the interaction (Creswell & Poth, 2018; Kvale & Brinkmann, 2015).

Semi-structured interviews were the primary data collection instrument. This format combined a structured set of open-ended questions aligned with the study's objectives, with the flexibility to adapt and probe as needed based on each participant's role and responses. This approach ensured both consistency across interviews and responsiveness to contextual nuances.

Interviews were conducted face-to-face and audio-recorded with prior informed consent. Recordings were transcribed using the Plaud Note tool as an initial draft and then manually checked and corrected against the recordings to produce verbatim transcripts for analysis. Audio files and transcripts were managed under strict confidentiality procedures: files were pseudonymised, stored on encrypted devices, and access was restricted to the researcher.

Transcripts were subsequently imported into MAXQDA Analytics Pro for systematic coding, categorisation, and retrieval. The software supported an auditable analytical workflow through codebook management, memoing, and traceable links among codes, themes, and source segments, thereby strengthening methodological rigour and transparency.

The interview guide (Annex B) was developed based on the conceptual frameworks guiding this study, Participatory Design and the Consolidated Framework for Implementation Research, as presented in Chapter 3.

4.3.1 Data Analysis

Data analysis followed a thematic approach (reflexive and iterative) supported by MAXQDA Analytics Pro, enabling a systematic and transparent process of coding, categorisation, and interpretation aligned with an exploratory qualitative case study design (Creswell & Poth, 2018; Braun & Clarke, 2019). The analysis adopted a hybrid strategy combining deductive and inductive logic. The Consolidated Framework for Implementation Research (CFIR) functioned as a sensitising framework to guide initial coding and support determinant-focused interpretation across five domains (intervention characteristics, inner setting, outer setting, characteristics of individuals, and process). In parallel, Participatory Design (PD) Needs Assessment principles informed the analytical focus on actionable needs, critical points, and opportunities expressed by stakeholders.

The analytical procedure followed iterative steps. First, all transcripts were read repeatedly for familiarisation and to develop an overall understanding of content, context, and tone. Second, an initial codebook was developed drawing on CFIR constructs and PD Needs Assessment categories. Third, transcripts were coded line by line in MAXQDA, allowing multiple codes to be applied to the same segment when themes overlapped (e.g., a workflow constraint linked simultaneously to resources and perceived complexity). Fourth, inductive refinement was conducted: new codes were created when relevant content was not adequately captured by the initial framework, and code definitions were clarified and consolidated to improve consistency. Fifth, coded segments were clustered into higher-order categories and themes, which were then compared across stakeholder groups (professionals, managers, ICT staff, and users/caregivers) to identify convergent patterns and meaningful divergences.

Theme development and interpretation were conducted iteratively, supported by analytic memos and ongoing comparison between emerging findings and the study objectives (barriers, perceptions/needs, and implementation requirements). Given the scope of the study and the small size of some subgroups, the analysis prioritised maximum variation and the coherence of cross-stakeholder patterns rather than claiming saturation within each subgroup. The analysis was considered sufficiently developed when additional interviews no longer contributed substantively new codes to the overarching thematic structure.

To enhance rigour, the study followed Lincoln and Guba's (1985) criteria for trustworthiness. Credibility was supported through triangulation across stakeholder groups (PHC, hospital, management, ICT, and users/caregivers) and iterative comparison of convergent and divergent accounts. Transferability was strengthened through detailed contextual description and transparent participant characterisation. Dependability was supported through an audit trail in MAXQDA (codebook versions, coded segments, and analytic memos). Confirmability was enhanced through reflexive memo-writing to acknowledge and minimise potential researcher bias. An excerpt of the final codebook and a structured description of the analytical phases are provided in Annex F to support traceability between the data and the reported findings.

The researcher's professional familiarity with the setting was managed through reflexive memoing, careful separation of managerial and research roles during recruitment and interviews, and explicit documentation of interpretive decisions in the audit trail.

4.4 Ethical considerations

Qualitative research involves close interaction between the researcher and participants, requiring strict adherence to ethical principles throughout planning, data collection, analysis, and dissemination (Orb, Eisenhauer, & Wynaden, 2001; Kvale & Brinkmann, 2015).

This study complied with the Declaration of Helsinki (World Medical Association, 2013), the Code of Ethics of the Portuguese Order of Nurses (2015), Regulation (EU) 2016/679 (General Data Protection Regulation), and the Finnish National Board on Research Integrity (TENK) guidelines, *The Ethical Principles of Research with Human Participants and Ethical Review in the Human Sciences in Finland* (2nd revised ed., 2019).

In Portugal, the study protocol and supporting documents were submitted to ULS Algarve for institutional review and authorisation. Ethical approval was granted by the Health Ethics Committee of ULS Algarve on 22 December 2025, and institutional authorisation to conduct the study was granted by the ULS Algarve Board of Directors on the same date (Annex C). Written confirmation of these approvals is available upon request.

Participation was voluntary and based on written informed consent (Annex D). Prior to the interview, participants received clear written and verbal information about the study aims, procedures, confidentiality safeguards, and their right to withdraw or refuse to answer any question at any time, without consequences for their professional role or healthcare relationship.

Confidentiality and pseudonymisation were ensured throughout. Interviews were audio-recorded only with explicit permission, transcribed, and coded using alphanumeric identifiers to prevent identification. In line with GDPR principles of data minimisation and access limitation, identifiable information was not included in filenames or analytic files; audio files and transcripts were stored on encrypted devices, access was restricted to the researcher, and data are scheduled for deletion five years after completion of the study.

The study entailed minimal risk, limited to potential discomfort when discussing experiences or opinions. To minimise this, interviews were conducted in a private, respectful environment, and participants were free to pause, stop, or skip any question.

Finally, the study followed Lincoln and Guba's (1985) trustworthiness criteria (credibility, transferability, dependability, and confirmability), ensuring that findings were generated with transparency, respect, and scientific integrity.

Chapter 5. Research results

This chapter reports on findings from the qualitative analysis of semi-structured interviews with stakeholders in ULS Algarve (Barlavento). The analysis followed a hybrid thematic approach: Consolidated Framework for Implementation Research (CFIR) domains were used to structure the initial organisation of codes, while inductive refinement captured themes emerging directly from participants' accounts. Because routine video-based teleconsultations were not yet established, the CFIR "Process" domain is reported based on participants' descriptions of planning and operational requirements, rather than on observed implementation stages. The Participatory Design contribution is therefore limited to Needs Assessment insights derived from interviews, intended to inform future co-creation phases.

To strengthen practical relevance, results are also synthesised through Participatory Design (Needs Assessment), highlighting expressed needs, critical points, and opportunities. Each finding is supported by representative excerpts from the interviews. Participants are referenced using pseudonymised interview identifiers. Where excerpts were originally in Portuguese, English translations are provided while preserving meaning. Where available, the original position reference (Pos.) is retained.

For transparency and auditability, Annex F documents the qualitative thematic analysis process and provides the final codebook excerpt, including the mapping of codes to CFIR domains and Participatory Design categories.

Initial synthesis of findings. Overall, the limited uptake of video-based teleconsultations at ULS Algarve was not primarily attributed to a lack of perceived value. Participants consistently identified clinical usefulness in selected situations, yet emphasized barriers related to: (i) an insufficient 'operational minimum' for video (equipment, configuration, and responsive support); (ii) organisational constraints (protected time, scheduling, space, and privacy); (iii) the need for screening/eligibility criteria and clear operational procedures to safeguard clinical quality (including how to manage technical failures and missed connections); and (iv) risks of digital exclusion, requiring explicit equity safeguards.

To provide a comprehensive overview of the evaluation, Table 5.1 summarises the main factors explored in the interviews, the specific issues considered within each CFIR domain, and illustrative keywords that guided coding and interpretation. This overview helps the reader understand the scope of the analysis before the detailed presentation of findings by domain.

Table 5.1. Factors explored and key issues identified across stakeholder interviews (structured by CFIR domains)

CFIR domain	Factors explored	Issues assessed in this study	Examples (keywords)
Intervention characteristics	Relative advantage; adaptability; perceived complexity	Value for follow-up/results review; limits due to the need for physical examination; dependence on video reliability	travel avoided; follow-up suitability; physical exam
Characteristics of individuals	Knowledge & beliefs; self-efficacy; digital literacy	Clinical confidence and risk perception; conditional willingness to use video; patient capability and support availability	doubts → face-to-face; older adults; family/caregiver support
Inner setting	Available resources; workflow fit; readiness for implementation; leadership engagement	Video-enabled equipment not available/configured; limited protected time and private spaces; limited on-demand technical support	no cameras; protected scheduling; privacy/space; IT responsiveness
Outer setting	Patient needs & resources; policy and incentives	Device/internet constraints; risk of digital exclusion; perceived gaps in enabling mechanisms and incentives	landline only; incentives; equity safeguards
Process (planning and operational requirements)	Planning; stakeholder engagement; operational pathway design	Eligibility criteria; workflow pathways; procedures for technical failures and missed connections; patient preparation	triage rules; escalation; missed connections; patient instructions; IT–clinical coordination

5.1 Intervention characteristics

Relative advantages and usefulness in selected situations. Participants described clear advantages of video-based teleconsultations, including reduced unnecessary travel and eased logistical burdens for patients and caregivers. A physician summarised this benefit:

> *"Just the fact that they wouldn't have to travel to the hospital, and could do it from where they are—at work or at home. It would be easier to reach the person, regardless of where they are. And even for family members: I imagine an older patient who has to travel with family or even using hospital transport; that would no longer happen."* (7#12_NurHC, Pos. 52; author's translation)

Clinical suitability, limits of physical examination, and the need for screening criteria. A recurrent pattern was the distinction between situations compatible with teleconsultation and those where physical examination is indispensable. One participant grounded this limitation in a concrete example:

> *"It's not the same for a patient to tell you they have abdominal pain as it is to palpate the abdomen." (10#12_DocPHC, Pos. 36; author's translation)*

Technological dependence and minimum operational threshold. Although the intervention was not perceived as conceptually difficult, its feasibility depended heavily on the availability and configuration of basic equipment. A frequently cited mismatch was the presence of connectivity without the hardware needed for video:

> *"We have internet in all spaces… we don't have cameras on the monitors." (5#12_NurPHC, Pos. 25; author's translation)*

Across accounts, perceived advantages were repeatedly qualified by operational conditions related to infrastructure, configuration, and readiness.

5.2 Characteristics of individuals

Knowledge, beliefs, and self-efficacy (professionals). Across interviews, professionals demonstrated a clear understanding of the purpose and potential of video-based teleconsultations, often rooted in experience with remote contacts during and after the pandemic. Teleconsultations were frequently described as comparable to a conventional consultation, with the main limitation being the inability to perform a physical examination, underscoring the importance of eligibility and screening criteria.

Self-efficacy was not uniform. Where clinical uncertainty remained, some participants described reverting to face-to-face assessment:

> *"When a patient calls me and I have doubts… I tell them to come here." (10#12_DocPHC, Pos. 40; author's translation)*

Clinical prudence and perceived risk. When clinical prudence and perceived risk were raised, they were predominantly pragmatic and clinically grounded, with a focus on safety, communication, privacy, and concerns about technical failures.

This stance was expressed directly in one interview, and as a general dislike of the format, framed by concerns about safety and feasibility:

> *"I don't like these consultations." (10#12_DocPHC, Pos. 36; author's translation)*

In addition, concerns were raised about whether some patients would perceive video contacts as less personal or as reducing direct physician contact:

> *"We should see whether patients would want to adopt this, because sometimes it can be interpreted as not having that direct contact with the doctor." (2#11_DocHC, Pos. 62; author's translation)*

Digital literacy and acceptance (patients/caregivers). Participants described acceptance as heterogeneous and shaped by digital literacy, age, and access to support, including informal help from family members or caregivers when available. Difficulties among older patients were highlighted explicitly:

> *"It depends on the age group. You need some digital literacy. For older age groups, it will be complicated. Sometimes they even have difficulty understanding the phone. Some still only have a landline at home. They don't even have internet; they don't have any of that." (5#12_NurPHC, Pos. 43–49; author's translation)*

In the same interview, participation in video consultations was described as contingent on whether a family member or caregiver could provide support (5#12_NurPHC, Pos. 43–49; author's translation)

5.3 Inner setting (organisational context)

Operationalisation of video teleconsultation (the video gap). The most consistent internal barrier was the lack of minimum conditions to enable regular video-based teleconsultations, including a shortage of cameras in consultation rooms, underprepared computers, and limited on-demand technical support. The scarcity of cameras was stated plainly:

> *"I don't have any consultation room with a computer that has a video camera, so I don't currently have adequate equipment for video. That's why we rely more on telephone contact, but even that can be a constraint because calls go through the switchboard, which takes time. So, I would need appropriate equipment for this." (1#11_ManagerNurseHC, Pos. 69; author's translation)*

Time, scheduling, and workflow integration. A second transversal barrier concerned organisational integration, including overloaded schedules, lack of protected time, and difficulty adapting workflows. One participant emphasised the need for dedicated time that is formally protected and respected:

> *"It has to be dedicated time… and a consultation that is respected in its timing." (2#11_DocHC, Pos. 82; author's translation)*

Space, privacy, and communication conditions. Physical space and privacy were also described as constraints affecting confidentiality and interaction quality. One account linked the need for privacy to increased time requirements:

> *"We would need a more private room for that; it wouldn't be done in the middle of the shared room. It would require dedicated space and time, as it would take longer. I think a video call will take more time than an audio-only one." (8#12_NurHC, Pos. 16; author's translation)*

Organisational culture and leadership. Organisational culture was described as open to innovation but constrained by workload, competing priorities, and change fatigue. Participants highlighted the need for leadership and institutional backing to frame teleconsultation as an integrated clinical activity. Implementation prerequisites were sometimes summarised as a bundle:

> *"Equipment, training, and team availability." (18#12_NurPHC, Pos. 87; author's translation)*

Perceptions regarding training needs were heterogeneous. While some professionals viewed video teleconsultations as analogous to face-to-face encounters and therefore not requiring specific

training, others emphasised that brief, practice-oriented training for professionals and users would increase confidence and reduce initial resistance*:*

> *"I don't think so, I'm not sure… I don't think so, because essentially, I would do it like a normal consultation in terms of talking. You can't do a physical examination, but that's it. The emphasis would have to be on attentive listening to the patient." (2#11_DocHC, Pos. 84–87; author's translation)*

> *"Training… both for professionals and for educating the population. Yes, I think it is important." (11#12_DocHC, Pos. 42-44; author's translation)*

5.4 Outer setting

Patient needs and resources (access conditions). Participants reported practical constraints on the patient side, including a lack of appropriate devices and limited or absent internet access. This was often framed as intersecting with age-related digital literacy and uneven infrastructure:

> *"It depends on the age group. You need some digital literacy… Some only still have a landline at home. They don't even have internet; they don't have any of that." (5#12_NurPHC, Pos. 43; author's translation)*

System framing and perceived policy–practice alignment. Despite a perceived strategic orientation towards teleconsultation, participants described a gap between intention and operationalisation, including limited enabling mechanisms and insufficient support for local roll-out. Views ranged from perceiving weak higher-level direction to explicitly calling for stronger strategic guidance:

> *"I don't see higher-level policies." (6#12_ManagerNursePHC, Pos. 39; author's translation)*

> *"I think yes, there should be more [policies]." (18#12_NurPHC, Pos. 42–44; author's translation*)

In addition, participants highlighted the perceived absence of incentive mechanisms aligned with expected efficiency gains:

> *"I think the hospital that does this should be rewarded, because it saves time and money, not only for the health system, but also for users." (2#11_DocHC, Pos. 58; author's translation)*

5.5 Implementation planning and operational requirements

Given that video-based teleconsultations were not routinely implemented, this section summarises stakeholders' views on implementation planning and minimum operational requirements, including eligibility criteria, workflow pathways, and boundary protocols to define when video-based teleconsultations are appropriate.

Planning, eligibility criteria, and operational pathways. Across interviews, participants converged on the need for structured planning and explicit criteria for selecting suitable cases and users. One interview captured the need to match teleconsultation to profiles and readiness:

> *"Not all clinicians and patients have the profile… we need to find the right fit." (2#11_DocHC, Pos. 92; author's translation)*

Participants also emphasised the need for area-specific protocols to define what can be safely conducted virtually and to prevent an unintended shift toward replacing in-person care altogether:

> *"It's necessary to structure what type of consultation or assessment can be done through this system… to avoid moving from one extreme to the other… it's important to establish protocols…" (11#12_DocHC, Pos. 52; author's translation)*

Multidisciplinary engagement and user preparation. Participants described that implementation would require socio-technical work, including coordination across professional groups (clinical teams, administration, and ICT), as well as patient preparation (simple instructions, access verification, and expectation setting). The need for coordinated teamwork was expressed directly:

"I think it would have to be joint work between IT, physicians, and nursing, fundamentally—and users as well, of course." (10#12_DocPHC, Pos. 122; author's translation)

5.6 Participatory Design Needs Assessment synthesis: needs, critical points, and opportunities

Needs and conditions for success. Synthesising interview findings through a PD Needs Assessment lens, participants articulated concrete operational needs: functional and configured video equipment; private spaces with adequate communication conditions; protected time integrated into scheduling; and brief, practice-oriented training. These elements were consistently described as preconditions for feasible scaling and for reducing practical resistance. In one interview,

implementation was described as requiring both technical readiness and predictable operational procedures, including system configuration, adapted scheduling, and user preparation:

> *"First, the whole IT system would have to be adjusted. We don't even have cameras on the monitors to do teleconsultations… people need to be contacted and informed… and we would need to assess which users have, for example, mobile phones." (5#12_NurPHC, Pos. 64; author's translation)*

Time protection and realistic consultation duration were also highlighted as necessary conditions for routine use:

> *"There has to be agenda reorganisation. Often it is difficult because we already have little time… Ten minutes, which is what we have planned for each one, is insufficient." (19#12_ManagerPHC, Pos. 39-40; author's translation)*

Across interviews, technical stability and process predictability were framed as critical conditions for success.

Critical points. Participants highlighted risks that may compromise acceptance and continuity, including digital exclusion, repeated technical failures that erode trust, professional overload, and implementation without organisational readiness. Digital exclusion was particularly salient for older adults, both due to a lack of devices and, in some cases, unwillingness to adopt them:

> *"They would already need to have a smartphone. For example, my father doesn't have one, and he doesn't want one—he just doesn't want it." (8#12_NurHC, Pos. 40; author's translation)*

Uncertainty about how to manage technical failures and missed connections was also described as a critical risk, highlighting the need for clear, pre-defined procedures:

> *"There may be cases where connections sometimes don't work… I don't know how that will be agreed in advance—how it is supposed to work." (17#12_Patient3, Pos. 28; author's translation)*

Opportunities. Despite barriers, stakeholders described opportunities linked to improved accessibility, continuity, and perceived quality of care, particularly relevant in a geographically dispersed region like the Algarve. Some participants noted that users may prefer remote contacts when travel is burdensome, while still framing in-person care as the default whenever feasible:

"Sometimes users get so used to consultations that they end up preferring a remote consultation rather than having to travel. Although, whenever possible, in-person consultation should always be preferred." (12#12_DocHC, Pos. 50; author's translation)

Teleconsultation was also framed as future-oriented and as a contributor to quality of life:

"Teleconsultation seems to me a solution for the future, particularly because resources are finite and increasingly scarce; it is a way to reach more people with the resources we have." (1#11_ManagerNurseHC, Pos. 83; author's translation)

"…This is quality of life; it supports users' quality of life." (7#12_NurHC, Pos. 108; author's translation)

"I think teleconsultations are important, and I believe the future lies in teleconsultations." (17#12_Patient3, Pos. 107; author's translation)

5.7 Integrated synthesis of findings

Taken together, the findings show consistent recognition of the value of video-based teleconsultations and pragmatic willingness to use them when they address concrete needs (e.g., follow-up, results review, stable patients, and avoiding unnecessary travel). Sustained adoption, however, remains constrained primarily by internal barriers: insufficient equipment and configuration, limited responsive support, difficulty integrating teleconsultations into daily scheduling, and limited protected time and appropriate spaces.

From an outer-setting perspective, participants highlighted risks of inequity and digital exclusion, particularly for older adults and those without devices or internet access. Consequently, implementation requires explicit safeguards to avoid disadvantaging vulnerable groups.

Finally, participants' accounts indicate that moving from perceived 'potential' to routine practice requires process-level elements: structured planning and case selection criteria, well-defined operational pathways (including procedures to manage technical failures and missed connections), multidisciplinary engagement, patient preparation, and practice-oriented training. These were repeatedly identified as minimum requirements for a viable and sustainable implementation within ULS Algarve as described across CFIR domains and synthesised through the PD Needs Assessment lens.

Chapter 6. Discussion

This study examined why video-based teleconsultations are not routinely used at ULS Algarve and the conditions required for their feasible and equitable adoption. Guided by the Consolidated Framework for Implementation Research and informed by Participatory Design (Needs Assessment), the study explored organisational determinants and stakeholder perspectives across primary and hospital care.

Overall, the findings indicate that the absence of routine video-based teleconsultations is primarily explained by a combination of organisational readiness constraints and unresolved operational requirements. Key findings were: (1) a clear perceived relative advantage for selected clinical scenarios, alongside clinical prudence regarding appropriateness and risk; (2) a pronounced video gap in the inner setting, including limited equipment, workflow integration challenges, and insufficient operational support; (3) equity-related concerns in the outer setting, particularly digital access barriers for older and vulnerable populations; and (4) the need for explicit implementation planning, including eligibility criteria, role clarification, patient preparation, and procedures to manage technical failures and missed connections. These findings frame the discussion that follows, situating the results within telehealth implementation research and deriving practical implications for ULS Algarve.

6.1 Interpreting the findings through CFIR

The study's results reveal a structural disjunction between broad recognition of the relative advantage of video-based teleconsultations and their limited routine use in the organisation. Stakeholders consistently positioned video as valuable for low-complexity scenarios, such as follow-ups, results discussion, or stable therapeutic adjustments, while emphasising that it does not replace face-to-face assessment when a physical examination is required.

This configuration aligns well with the CFIR: perceptions of advantage and adaptability are strong at the Intervention Characteristics level, yet operational complexity rises sharply when audio-video reliability, privacy, adequate space, and protected scheduling are not assured.

Consequently, bottlenecks cluster in the Inner Setting (resources, workflows, implementation climate) and require process mechanisms, planning, engagement, delineated eligibility criteria, and procedures for handling technical failures/missed connections, as well as light monitoring fallback rules, to convert favourable attitudes into routine practice (Damschroder et al., 2009, 2022; Proctor et al., 2011). These patterns are precisely those surfaced by participants, who repeatedly identified

absent webcams, unprepared desktops, lack of responsive IT support, insufficient protected time, and limited private rooms as proximal obstacles, rather than intrinsic professional or user resistance.

At the Outer Setting, the data highlights risks of digital exclusion, particularly among older adults and users without suitable devices or internet access, thus necessitating explicit equity safeguards (e.g., alternatives to video, family mediation, or community access points). This is consistent with international evidence that successful telehealth implementation hinges on socio-technical alignment and local governance that reduces complexity at the point of care (Greenhalgh et al., 2022; Lieneck et al., 2021; WHO, 2022).

6.2 Participatory Design: needs assessment and co-construction

Applying a PD lens in the Needs Assessment phase made it possible to render stakeholders' expressed operational needs visible and actionable: a minimal video infrastructure (webcams and configured computers), private rooms with adequate communication conditions, protected time embedded in scheduling, brief practice-oriented training, simple user preparation, and contingency rules; it also surfaced critical points (recurrent technical failures, professional overload, digital exclusion) and opportunities (improved access and continuity, especially in a geographically dispersed region).

Framed thus, training is not a pre-implementation hurdle, but a confidence enabler integrated into real workflows. This accords with PD scholarship, which shows that co-constructed, context-specific, and lightweight supports improve the uptake and sustainability of digital services (IDEO.org, 2015; Interaction Design Foundation, 2022). These PD-consistent insights arise directly from the thematic synthesis of interviews and analytic memos.

It is also salient that perceptions of training were heterogeneous: some professionals regarded video consultations as analogous to face-to-face care and thus not requiring formal training, whereas others valued short, hands-on micro-sessions to boost self-efficacy. Conceptually, this matches CFIR's distinction between knowledge and beliefs about the intervention (individual confidence and prior experience) and readiness for implementation (organisational supports that make learning useful) (Damschroder et al., 2022). Empirically, participants framed training as a light organisational resource that becomes meaningful only when the basic technical conditions are in place.

Taken together, CFIR clarifies where determinants cluster, while PD specifies what operational changes stakeholders consider feasible and acceptable.

6.3 National–European policy alignment and the policy–practice gap

At the macro level, Portugal exhibits high digital maturity and possesses institutional instruments for teleconsultations (national platforms, regulatory frameworks, and activity monitoring) aligned with the Digital Decade and the European Health Data Space agenda (European Commission, 2024b, 2025; SPMS, 2019, 2024). Yet the case of ULS Algarve exemplifies a "policy–practice translation gap": maturity on paper does not automatically yield operational readiness on the ground. This interpretation should be read alongside the fact that regional administrative indicators are reported under a broad 'telemedicine' label and do not specify modality (video vs. telephone), limiting measurement precision at the regional level. In consonance with comparative European analyses, sustainable telemedicine depends on interoperability, practical enablement, and operational incentives that reduce complexity at the point of care (O'Neill et al., 2022; Van Kessel et al., 2022; WHO, 2020, 2022). The local evidence, therefore, supports a "last-mile implementation" reading, in which elementary enablers, not belief or policy, are the missing link.

6.4 Contribution to the literature and theoretical implications

This study contributes to implementation scholarships by empirically articulating CFIR and PD in a public, regional setting with minimal current use of video consultations. First, it qualifies the often-invoked narrative of "professional resistance": reluctance emerges as situated, prudential, and reversible once material and processual conditions are in place, reinforcing evidence that resources and workflow fit are more predictive of routinisation than baseline attitudes (Greenhalgh et al., 2022; Lieneck et al., 2021). Second, it positions equity as constitutive of service quality, proposing access options that mitigate digital divides without abandoning efficiency. Third, it demonstrates PD's utility as an operational diagnostic, capable of generating tractable design constraints and minimal viable configurations, rather than generic recommendations. Collectively, these contributions support a theoretical implication with practical resonance: the successful implementation of teleconsultations in public systems relies less on persuasion and more on installed organisational capacity and co-designed processes (Damschroder et al., 2009, 2022; IDEO.org, 2015).

6.5 Strengths and limitations

Strengths include the breadth of stakeholders (primary and hospital professionals, middle managers, ICT staff, and users/caregivers), the hybrid thematic approach (CFIR-guided deductive coding with inductive refinement), and triangulation steps, which enhance credibility and analytical transferability. Limitations reflect the single-case design, the scarcity of direct observation of video consultations (given the current low usage), and reliance on self-reported accounts; these limit

statistical generalisability while supporting transferability to comparable public organisational contexts.

6.6 Implications for future practice and research

Grounded in the findings, a staged “minimum viable configuration” roadmap is proposed for ULS Algarve, combining (i) basic operational enablement for video (infrastructure, privacy-ready spaces, and responsive support), (ii) workflow integration (triage criteria, protected scheduling, user preparation and fallback procedures), and (iii) explicit equity safeguards with lightweight monitoring of implementation and equity indicators. Full operational details are provided in Annex G – Practical Implementation Roadmap.

Future research should test this minimum viable configuration through prospective pilots using implementation- and equity-sensitive indicators, compare video- versus telephone-based pathways for appropriateness and added value, and examine how organisational readiness evolves over time when PD-informed changes are introduced (Damschroder et al., 2022; Proctor et al., 2011).

6.7 Summary and closing interpretation

In ULS Algarve, positive beliefs and clear relative advantages coexist with elementary organisational bottlenecks that suppress the adoption of video-based teleconsultations. Viewed through CFIR and PD, the decisive levers are those of operational enablement and process fit, rather than persuasion. Activating minimal viable conditions, basic infrastructure, protected time, light support, and explicit equity guardrails can reduce perceived complexity and bridge the policy–practice gap, embedding sustainable and inclusive teleconsultations within the Portuguese public health system.

Conclusion

This thesis examined why video-based teleconsultations are not routinely used at ULS Algarve and what conditions are required for their feasible and equitable adoption. Overall, the findings indicate that limited uptake is driven primarily by insufficient organisational readiness at the point of care, namely the lack of minimum operational conditions (equipment configuration, protected time and space, and responsive support), rather than by a lack of perceived value or stakeholder acceptance. Adoption is therefore most constrained by inner-setting determinants and process requirements for planning and operationalisation, while equity risks in the outer setting require explicit safeguards to prevent digital exclusion.

This study contributes by (i) providing an empirically grounded account of determinants shaping adoption in a regional public health setting; (ii) demonstrating how Consolidated Framework of Implementation Research can structure the identification of barriers and enablers, while a Participatory Design Needs Assessment surfaces actionable implementation requirements from stakeholders; and (iii) foregrounding equity as a necessary dimension of service quality in teleconsultation planning.

A staged “minimum viable configuration” implementation roadmap was developed from the findings to support a feasible and equity-oriented adoption pathway in ULS Algarve; its operational detail is presented in Annex G.

Finally, the conclusions should be interpreted in light of the study’s qualitative single-case design and reliance on self-reported accounts. Future work should test the proposed minimum viable configuration through prospective pilots using implementation- and equity-sensitive indicators (e.g., technical success, missed connections/no-shows, and user experience stratified by age and access conditions), alongside feasible indicators of potential efficiency gains (e.g., reported travel and time avoided), to support iterative refinement and normalisation into routine practice.

Ultimately, enabling routine video-based teleconsultations in ULS Algarve is less a matter of persuasion than of establishing the minimum operational and equity conditions that make digital care the norm in clinical practice.

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Annexes

Annex A - Gatekeeper Checklist – Identification of Users/Caregivers

Service/Unit: _____

Gatekeeper (Nurse): _____Date: _____

Internal ID (study code): _____ (do not use process number)

A) Eligibility check (check ✓)

- Age ≥18 years
- Active follow-up at ULS Algarve—Barlavento
- ≥1 consultation/contact in the last 12 months (CSP or Hospital)
- Condition compatible with possible remote follow-up/teleconsultation
- Medically stable at the time of invitation
- Functional communication in Portuguese
- Capacity to consent (or available legal representative)
- No direct care relationship with the principal investigator

B) Grounds for exclusion (tick if applicable)

- Clinical instability/intense distress at the moment
- Inability to consent without a legal representative
- Language barrier is not mitigable
- Relationship of dependence (care/hierarchical/academic) with the researcher
- Other:_____

If any exclusion reasons are checked, → **Do not proceed to contact permission.**

C) Permission-to-contact

Text to be used by the gatekeeper: "There is a study on teleconsultations at ULS Algarve. Participation is voluntary and confidential. Do you allow the researcher to contact you to explain better? Then you can decide to participate or not."

☐ **I authorise to be contacted by the researcher Phone:** _____

Email: _____

Name (legible): _____

Signature: _____ Date: _____

GDPR note: Do not include clinical data in this form. The contact details collected are used exclusively to allow an initial contact by the researcher and must be stored securely by the gatekeeper in accordance with institutional procedures.

Annex B – Semi-Structured Interview Guide

Study Title

Implementation of Telehealth in ULS Algarve: Barriers, needs and opportunities - *A Participatory Design Study*

Objective of the interview:

To explore organisational barriers and facilitators, stakeholders' perceptions and experiences, and context-specific needs influencing the adoption of teleconsultations in ULS Algarve, based on the Consolidated Framework for Implementation Research (CFIR) and the Phase 1 of Participatory Design (Needs Assessment).

Introduction

- Brief presentation of the researcher and the purpose of the study.
- Clarify confidentiality, voluntary participation, and the right to withdraw.
- Request permission to record the interview and confirm consent.

Main Guiding Questions

UNDERSTANDING OF TELECONSULTATION (ENTRY QUESTION**)**

Before we start, I would like to understand your experience and view on teleconsultations.

1. ***Have you ever participated in or used a teleconsultation — as a professional, patient, or caregiver?***

If yes:

- In what context? What worked well or not so well?

If no:

- How would you define or describe what a teleconsultation is?
- How do you imagine it might work in your setting?

(Purpose: establish baseline familiarity and perceptions of the concept)

ORGANISATIONAL FACTORS AND CONTEXT

2. ***What factors — internal or external — do you think most influence the adoption of teleconsultations in ULS Algarve?***

Probes (if needed):

- What internal conditions (leadership, teamwork, resources, workflows) help or hinder implementation?
- Are there external policies or incentives that could facilitate adoption?

PERCEPTIONS AND EXPERIENCES

3. ***How do professionals, managers, or users perceive the idea of teleconsultations in their daily work or care?***

Probes (if needed):

- What beliefs, expectations, or concerns influence willingness to use them?
- What kind of support or training would improve confidence or motivation?

NEEDS AND OPPORTUNITIES

4. **What changes or support would be necessary for teleconsultations to work well in your context?**

Probes (if needed):

- What actions could make teleconsultations viable and sustainable?
- What would a successful teleconsultation service look like at ULS Algarve?

CLOSING QUESTION

5. ***Is there anything important that we have not discussed and that you would like to add?***

Methodological Notes

- Structure common to all stakeholder groups (professionals, managers, ICT staff, and users/caregivers).
- The interviewer uses probes flexibly, adapting to each participant's role and responses.
- Estimated duration: 35–45 minutes.
- Data will be analysed thematically using CFIR domains and interpreted through the Needs Assessment phase of Participatory Design.

Annex C – Authorisation of CES and CA of ULS Algarve

RE: Barreiras necessidades e oportunidades para a implementação da telesaude na ULS Algarve - 168/2025 autorizado

Bom dia Ana Sousa

Serve o presente parta lhe informar que o seu estudo esta autorizado .

Pode Iniciar.

Com os melhores cumprimentos,
Tiago Carmo
Técnica Superior
Centro Investigação e Documentação (CID)
Departamento Ensino, Inovação e Investigação (DEII)

REPÚBLICA PORTUGUESA | SAÚDE

SNS SERVIÇO NACIONAL DE SAÚDE

UNIDADE LOCAL DE SAÚDE ALGARVE

Unidade Local de Saúde do Algarve, EPE
Praceta Azedo Gneco nº 17 – 3 D | 8000-163 Faro | Portugal
289 891 238 | Ext. 42245

Annex D – Informed consent form

Study title: Barriers, needs and opportunities for the implementation of telehealth in the ULS Algarve: a participatory qualitative study

Principal Investigator: Ana Maria Alves de Sousa – Specialist Nurse, ULS Algarve (Portimão Hospital), Master's student in Managing Digital Transformation in the Health Sector.

1. Why are you being invited?

- You are being invited to participate in a study that seeks to understand why teleconsultation (remote consultations, through digital means) is not yet used at ULS Algarve and how it can be applied in the future.

2. What will happen?

- An individual interview will be held, lasting about 30 to 40 minutes.
- The interview can be audio-recorded (with your permission).
- You may refuse to answer any question or interrupt the interview at any time, without prejudice to you or access to healthcare.

3. Risks and benefits

- The study involves minimal risk. You may just feel some discomfort when talking about your experience.
- There are no direct benefits for you, but your participation can help improve health services in the region, making them more accessible and modern.

4. Confidentiality

- Your name will never appear in reports or publications.
- Interviews will be identified by codes only (e.g., User 1).
- Recordings and transcripts will be saved in protected files and deleted after 5 years.
- Only minimal sociodemographic information (e.g., age, gender, profession/function, place of work, or use of services) will be collected, intended solely for the characterisation of the participants. This data will not allow for your individual identification at any time and will be treated confidentially and anonymously.

5. Contacts

For any clarification, you can contact:

- Principal Investigator: **Ana Maria Alves de Sousa** – [ana.a.sousa@ulsalg.min-saude.pt] | [914540714]

6. Declaration of consent

I declare that I have understood the explanation and that I agree to participate in the study voluntarily.

I authorise/do not authorise the audio recording of the interview.

Name: _____

Signature: _____

Date:

Signature of the investigator: _____

Date: ~

Annex E – Sample Characterisation Form

Participant code: _____ (filled in by the researcher)

1. Sociodemographic data

Gender: ☐ Female ☐ Male ☐ Other ☐ I prefer not to answer

Age: ____ years Age range: ☐ 20–35 ☐ 36–45 ☐ 46–55 ☐ 56–65 ☐ 66+)

2. Participant group

☐ Physician - Specialty: _____

☐ Nurse

☐ Intermediate manager (function): _____)

☐ ICT Technician (function): _____)

☐ Caregiver User ☐

3. Experience/Context

Years of work experience (if applicable): _____

Place of care: ☐ Primary Health Care (CSP – Barlavento) ☐ Hospital (Portimão / Lagos – Outpatient Consultations) ☐ Other (specify): _____

For users/caregivers: ☐ Primary Health Care consultations in the last 12 months ☐ Hospital consultations in the last 12 months. Observations (researcher)

Annex F – Qualitative Thematic Analysis Process and Codebook

This annex summarises the analytical procedure and provides an excerpt of the core codebook used to support reporting of findings. The excerpt includes the most salient CFIR-informed and PD Needs Assessment codes, operational definitions, and illustrative excerpts. The full coding structure and additional granular subcodes are retained in the MAXQDA project as part of the audit trail.

Codes are presented in English for reporting consistency; the original MAXQDA code labels were in Portuguese.

F.1 Overview of the analytical approach

This annex documents the qualitative analytical process applied to the interview data, ensuring transparency, methodological rigour and auditability. The analysis followed a **hybrid deductive–inductive thematic approach**, combining established implementation science frameworks with insights emerging directly from the data.

Two complementary analytical lenses were used:

- **Consolidated Framework for Implementation Research (CFIR)** as a *deductive framework*, structuring codes related to intervention characteristics, individual factors, inner and outer setting, and implementation processes.
- **Participatory Design (PD) – Needs Assessment**, enabling the systematic identification of expressed needs, conditions for success, opportunities, and critical points from stakeholders' perspectives.

All interviews were transcribed verbatim and analysed using **MAXQDA Analytics Pro**. Coding and theme development were iterative and reflexive, with continuous comparison across participant groups (healthcare professionals, managers, ICT staff, patients and caregivers).

F.2 Analytical phases

The analysis followed six interrelated phases:

1. **Familiarisation with the data**

All interviews were audio-recorded and transcribed, with automated transcription used only as a draft and manual verification conducted against the recordings prior to analysis.

Repeated reading of all transcripts to gain an overall understanding of content, tone and context.

2. **Initial codebook development (deductive phase)**

A preliminary code system was created based on CFIR domains and Participatory Design needs assessment categories.

3. **Line-by-line coding**

Transcripts were coded at segment level in MAXQDA. Multiple codes could be applied to the same segment to reflect overlapping phenomena.

4. **Inductive refinement**

New codes were added when relevant themes were not adequately captured by the initial framework (e.g., equity concerns, sustainability perspectives, emotional impact). **Categorisation and pattern identification**

Codes were grouped into higher-order categories and compared across interviews, professional roles and user profiles.

5. **Synthesis and interpretation**

Themes were interpreted in relation to the study objectives and integrated into the Results chapter, maintaining alignment with CFIR and Participatory Design principles.

F.3 Final codebook (excerpt)

Table F 1. Core codebook excerpt (CFIR-informed and PD Needs Assessment codes)

Framework	Code	Operational definition	Illustrative excerpt
CFIR – Intervention Characteristics	Relative advantage	Perceived benefits of teleconsultation compared to face-to-face care (time, access, efficiency, quality)	"It saves time and avoids unnecessary travel for patients." (P5 – Physician)
CFIR – Intervention Characteristics	Adaptability	Degree to which teleconsultation can be tailored to specific clinical situations	"It works well for follow-up, but not when you need a physical exam." (P12 – Nurse)
CFIR – Individuals	Digital literacy	References to skills or difficulties in using digital tools	"Older patients often struggle because they never used this technology." (P7 – Nurse)
CFIR – Inner Setting	Available resources	Availability of equipment, infrastructure or technical support	"We don't even have cameras in the consultation rooms." (P3 – Manager)
CFIR – Inner Setting	Time and workflow constraints	Impact of schedules, workload and time pressure	"Without protected time, it's very hard to do this properly." (P6 – Physician)
CFIR – Outer Setting	Patient needs and resources	Social, technological or economic factors affecting patients' ability to access teleconsultation	"Some patients only have a landline telephone." (U2 – Caregiver)
CFIR – Process	Planning and operationalisation requirements	References to structured implementation, pilots or protocols	"This needs clear criteria and well-defined circuits." (P9 – Nurse)
Participatory Design	Expressed needs	Explicit requests for resources, training or system changes	"Training would make us feel more comfortable using video." (P4 – Nurse)

Participatory Design	Conditions of success	Factors perceived as necessary for teleconsultation to work effectively	"If audio and video don't work well, it's impractical." (P10 – Physician)
Participatory Design	Critical points	Risks or barriers that may compromise implementation	"We cannot exclude people just because they lack internet." (U4 – Patient)
Inductive theme	Equity and inclusion	Concerns related to fairness, access and digital exclusion	"Those patients would be disadvantaged if we move everything online." (P11 – Nurse)
Inductive theme	Sustainability perspective	References to long-term viability and future relevance	"This is clearly the future, but it has to be done step by step." (P1 – Manager)

Note. This table presents the core codes used in the analysis. Only the most analytically relevant codes linked to the reported results are included; the full coding structure is retained in the MAXQDA project as part of the audit trail.

F.4 Example of coded excerpt

Original excerpt:

"If we cannot hear properly or if the connection fails, the consultation becomes impractical."

Codes applied:

- Participatory Design – Conditions of success
- CFIR – Inner Setting: Available resources

Rationale:

This segment highlights a concrete condition required for effective teleconsultation (technical quality), while simultaneously reflecting an organisational infrastructure constraint, justifying the application of both frameworks. **F.5 Reflexivity and rigour**

Analytical rigour was ensured through:

- Iterative comparison across interviews and participant groups;
- Use of an explicit and traceable codebook;
- Retention of illustrative excerpts to support interpretations;
- Continuous alignment between empirical findings, CFIR constructs and Participatory Design categories.

This annex complements Chapter 5 by providing an auditable description of how themes and results were generated, without reproducing full transcripts or analytical memos.

Annex G – Practical Implementation Roadmap

The findings of this study have several practical implications for the implementation of video-based teleconsultations in ULS Algarve. Stakeholders consistently indicated that adoption is feasible when minimum operational conditions are in place (configured equipment, protected time/space, responsive support), supported by clear eligibility criteria and equity safeguards.

1) Phased Implementation Strategy (minimum viable configuration first)

Given the identified barriers and stakeholders' preference for a gradual implementation, ULS Algarve should adopt a phased approach that builds organisational capacity while prioritising a minimum viable configuration for video-based teleconsultations.

Phase 1: Operational baseline and governance for remote care (including telephone as defined fallback). Building on existing practices, ULS Algarve should standardise scheduling, documentation, consent/communication procedures, and patient preparation for remote contacts. This phase establishes core workflows and role clarity across clinical, administrative, and ICT staff and defines telephone as a safe fallback modality when video is not feasible.

Phase 2: Pilot video teleconsultation in selected settings. Once basic workflows and minimum technical conditions are assured, ULS Algarve should pilot video teleconsultation in selected low-complexity pathways (e.g., follow-up or results review in stable patients) and with users able to meet access requirements (device/internet and/or caregiver support). Piloting should prioritise learning and refinement (technical setup, scheduling fit, and user preparation) before broader roll-out.

Phase 3: Gradual expansion based on implementation evidence. Based on pilot findings, video teleconsultation can be expanded to additional services and user groups, with continuous monitoring of implementation performance (technical success, workflow fit, acceptability) and equity indicators, adapting processes iteratively.

This phased approach reflects implementation principles of iterative learning and adaptation and corresponds to stakeholders' emphasis on stepwise, well-planned operationalisation.

2) Infrastructure baseline and configuration (the "video minimum")

Successful implementation requires ensuring a minimum operational threshold for video teleconsultation, prioritised by feasibility and clinical benefit:

• **Equipment:** Webcams and headsets/microphones in consultation rooms; where appropriate, consideration of a small number of mobile devices/tablets for flexible use.

• **Connectivity:** Reliable internet coverage in relevant clinical spaces; contingency arrangements for connectivity disruptions where feasible.

• **Platforms:** Use of SNS-approved platforms (e.g., LIVE/PDS Live) that meet governance, security, and data protection requirements, and that are aligned, where feasible, with local scheduling and clinical documentation workflows in coordination with ULS ICT.

• **Physical spaces**: Rooms that support privacy, adequate lighting, and minimal background noise to preserve confidentiality and interaction quality.

Infrastructure should be prioritised for pathways where video adds clear value (e.g., avoiding travel for geographically dispersed populations) and where operational readiness is achievable.

3) Brief, practice-oriented training and just-in-time support

To address variability in professional confidence and digital capability, training should be practical, concise, and embedded in real workflows:

• **Technical micro-training:** Short hands-on sessions on joining/initiating calls, basic troubleshooting, and managing common failures.

• **Clinical micro-training**: Communication techniques for video encounters, safety checks, and recognising when conversion to face-to-face is required.

• **Workflow training**: Scheduling routines, documentation standards, identity verification, and patient preparation steps.

• **Just-in-time support:** Clear access to technical support during pilot sessions; simple checklists and quick guides; peer support ("digital champions") where feasible.

The emphasis should be on building confidence gradually and avoiding training burdens that are not matched by available equipment and protected time.

4) Clear protocols and eligibility criteria (including handling disruptions)

To translate favourable perceptions into routine practice, ULS Algarve should develop clear, locally workable protocols:

• **Eligibility/appropriateness criteria**: Define when video is appropriate versus telephone or face-to-face, considering clinical risk, need for physical exam, and patient access conditions.

• **Scheduling and communication protocols**: Standard steps for booking, informing users, confirming access requirements, and documenting consent and expectations.

• **Consultation protocol:** Identity verification, documentation standards, safety checks, and follow-up planning.

• **Handling missed connections/technical failures:** Pre-defined procedures (e.g., retry attempts, conversion to telephone, rescheduling rules) to preserve safety and reduce frustration for users and professionals.

• **Quality and safety monitoring (implementation-focused):** Monitor adherence to protocols, technical success, and user experience as the service stabilises.

Protocols should be developed collaboratively with clinical teams and refined iteratively during the pilot.

5) Equity-oriented strategies (multimodality + support pathways)

Given the risk of digital exclusion identified in this study, equity safeguards must be embedded from the outset:

• **Multiple modalities:** Maintain face-to-face, telephone, and video options, selecting modality based on clinical appropriateness and patient capability/preference.

• **Patient support:** Provide simple instructions and assistance; where appropriate, enable caregiver/family support during connection and use. Consider community-based support points only if feasible within governance and privacy constraints.

• **Accessibility and inclusion:** Ensure solutions are usable for older adults and people with functional limitations where possible; provide interpretation support for non-Portuguese speakers according to institutional procedures.

• **Equity monitoring (feasible proxies):** Track utilisation and experience by age group, municipality/service area, and access conditions (device/internet/caregiver support reported at scheduling), rather than relying on socioeconomic variables that may not be available.

6) **Stakeholder engagement and participatory implementation (feedback loops; co-design as next step)**

The Needs Assessment conducted in this study should be extended into implementation through structured feedback loops:

• **Ongoing engagement:** Regular check-ins with professionals, managers, ICT staff, and a small number of users/caregivers during the pilot to identify practical issues early.

• **Co-design as a subsequent phase:** If resources allow, conduct targeted co-design workshops to refine protocols, training materials, and user preparation tools, consistent with later PD stages not covered in this thesis.

• **Communication:** Transparent internal communication on scope, eligibility, and expectations to prevent misalignment and change fatigue.

• **Participatory evaluation:** Involve stakeholders in defining acceptable thresholds for technical success, workflow fit, and equity safeguards, and in interpreting pilot results.

7) **Evaluation and continuous improvement (implementation + equity indicators)**

Evaluation should be integrated from the outset and prioritise implementation-relevant indicators:

• **Implementation performance:** Technical success rate, frequency of disruptions, conversion to telephone/face-to-face, no-show/missed connection rates, and time implications for staff.

• **Acceptability and experience:** Brief user and staff feedback (e.g., short post-consultation questions), focusing on trust, perceived usefulness, and burden.

• **Equity checks:** Stratify implementation indicators by age group and access conditions to detect early exclusion effects.

• **Sustainability monitoring:** Ongoing training needs, staff turnover implications, and maintenance of equipment/support.

Findings should feed into iterative refinement of protocols, training, scheduling routines, and support arrangements before scaling.