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TELEINTERCONSULTA NA ATENÇÃO PRIMÁRIA À SAÚDE E SEUS EFEITOS NA EFETIVIDADE CLÍNICA E INTEGRAÇÃO DAS REDES: REVISÃO INTEGRATIVA

TELEINTERCONSULTATION IN PRIMARY HEALTH CARE. CLINICAL EFFECTIVENESS AND HEALTH CARE NETWORK INTEGRATION: AN INTEGRATIVE REVIEW

TELEINTERCONSULTA EN LA ATENCIÓN PRIMARIA DE SALUD Y SUS EFECTOS SOBRE LA EFECTIVIDAD CLÍNICA Y LA INTEGRACIÓN DE LAS REDES: REVISIÓN INTEGRADORA

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Resumo

Introdução: A teleinterconsulta, modalidade de telessaúde que possibilita a comunicação interprofissional entre profissionais da Atenção Primária à Saúde (APS) e especialistas de outros níveis assistenciais, mediada por tecnologias de informação e comunicação, tem-se consolidado como estratégia relevante para ampliar a resolutividade da APS, reduzir encaminhamentos evitáveis e fortalecer a integração das redes de atenção à saúde. Objetivo: Sintetizar as evidências científicas sobre o impacto da teleinterconsulta na efetividade da APS e na integração das redes de atenção à saúde. Método: Revisão integrativa da literatura, com buscas nas bases de dados PubMed/MEDLINE, Scopus, Web of Science, SciELO e BVS, abrangendo preferencialmente publicações de 2014 a 2025, com inclusão justificada de estudos seminais anteriores a esse período. Resultados: Foram incluídos 11 estudos, organizados em seis categorias temáticas: (1)

REMUNOM
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Pages: 1-30

impacto na resolutividade da APS; (2) apoio à decisão clínica; (3) redução de encaminhamentos evitáveis; (4) integração entre níveis assistenciais; (5) educação permanente e desenvolvimento profissional; e (6) barreiras técnicas, organizacionais, éticas e regulatórias. As evidências indicam que a teleinterconsulta melhora a capacidade resolutiva da APS, com taxas de redução de encaminhamentos evitáveis variando entre 38% e 71% conforme o contexto e a especialidade, aprimora a coordenação do cuidado e favorece a integração das redes. Barreiras relacionadas à infraestrutura, ao treinamento profissional, à regulação e à ética persistem como desafios relevantes. Conclusão: A teleinterconsulta constitui uma intervenção com evidências promissoras de impacto positivo na APS e nos sistemas de saúde, com maior consistência para desfechos de processo; sua implementação é recomendada como parte de estratégias abrangentes de fortalecimento das redes de atenção, acompanhada de investimentos em infraestrutura, governança e avaliação sistemática de resultados.

Palavras-chave: Teleinterconsulta; Teleconsultoria; Atenção Primária à Saúde; Redes de Atenção à Saúde; Integração de sistemas de saúde; Encaminhamento e consulta.

Abstract

Introduction: Teleinterconsultation, a telehealth modality enabling interprofessional communication between primary health care (PHC) professionals and specialists from other levels of care, has emerged as a relevant strategy to improve PHC resolvability, reduce avoidable referrals and strengthen health care network integration. Objective: To synthesize scientific evidence on the impact of teleinterconsultation on PHC effectiveness and health care network integration. Method: Integrative literature review searching PubMed/MEDLINE, Scopus, Web of Science, SciELO and VHL, covering publications from 2014 to 2025, with justified inclusion of seminal earlier studies. Results: Eleven studies were included and organized into six thematic categories. Evidence indicates that teleinterconsultation improves PHC resolvability, with avoidable referral reduction rates ranging from 38% to 71%, enhances care coordination and favours network integration. Infrastructure, professional training, regulatory and ethical barriers persist. Conclusion: Teleinterconsultation is an intervention with promising evidence of positive impact on PHC and health systems, with greater consistency for process outcomes; its implementation is recommended as part of comprehensive network-strengthening strategies, accompanied by investments in infrastructure, governance and systematic outcome evaluation.

Keywords: Teleconsultation; E-consultation; Primary Health Care; Health Care Networks; Health systems integration; Referral and consultation.

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Resumen

Introducción: La teleinterconsulta, modalidad de telesalud que posibilita la comunicación interprofesional entre profesionales de la Atención Primaria de la Salud (APS) y especialistas de otros niveles asistenciales, mediada por tecnologías de la información y la comunicación, se ha consolidado como una estrategia relevante para ampliar la capacidad resolutiva de la APS, reducir derivaciones evitables y fortalecer la integración de las redes de atención en salud.

Objetivo: Sintetizar la evidencia científica sobre el impacto de la teleinterconsulta en la efectividad de la APS y en la integración de las redes de atención en salud. Método: Revisión integradora de la literatura, con búsquedas en las bases de datos PubMed/MEDLINE, Scopus, Web of Science, SciELO y BVS, abarcando preferentemente publicaciones de 2014 a 2025, con inclusión justificada de estudios seminales anteriores a ese período. Resultados: Se incluyeron 11 estudios, organizados en seis categorías temáticas: (1) impacto en la capacidad resolutiva de la APS; (2) apoyo a la toma de decisiones clínicas; (3) reducción de derivaciones evitables; (4) integración entre niveles asistenciales; (5) educación permanente y desarrollo profesional; y (6) barreras técnicas, organizacionales, éticas y regulatorias. La evidencia indica que la teleinterconsulta mejora la capacidad resolutiva de la APS, con tasas de reducción de derivaciones evitables que varían entre el 38% y el 71%, según el contexto y la especialidad; asimismo, optimiza la coordinación del cuidado y favorece la integración de las redes. Persisten como desafíos relevantes las barreras relacionadas con la infraestructura, la capacitación profesional, la regulación y la ética. Conclusión: La teleinterconsulta constituye una intervención con evidencia prometedora de impacto positivo en la APS y en los sistemas de salud, con mayor consistencia para los desenlaces de proceso; su implementación se recomienda como parte de estrategias integrales de fortalecimiento de las redes de atención, acompañada de inversiones en infraestructura, gobernanza y evaluación sistemática de resultados.

Palabras clave: Teleinterconsulta; Teleconsultoría; Atención Primaria de la Salud; Redes de Atención en Salud; Integración de sistemas de salud; Derivación y consulta.

1. INTRODUCTION

Primary Health Care (PHC) constitutes the structural component of health systems guided by the principles of comprehensiveness, continuity, and care coordination. In contexts marked by growing epidemiological complexity — characterized by the predominance of chronic non-communicable conditions and

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Pages: 1-30

the occurrence of multimorbidity — PHC faces the challenge of expanding its resolvability while maintaining care coordination and avoiding excessive dependence on referrals to specialized care. This process can contribute to care fragmentation, delays in access to specialist services, and overload of health care networks (Starfield *et al.*, 2005; Mendes, 2010).

In this context, teleinterconsultation can be understood as a modality of care mediated by information and communication technologies, in which PHC professionals request the evaluation or guidance of specialists from other levels of care, in real time or asynchronously. This strategy enables clinical exchange between professionals and has been described as a mechanism capable of reducing geographic, temporal, and knowledge-access barriers, providing greater support for clinical decision-making in PHC (Ekeland *et al.*, 2010; Vimalananda *et al.*, 2015).

Unlike teleconsultation, which involves direct interaction between a health professional and a patient mediated by communication technologies, teleinterconsultation is characterized as an interprofessional communication process between professionals from different levels of care. Its central purpose is to support clinical decision-making, improve care quality, and contribute to the resolution of diagnostic or therapeutic doubts within the PHC setting itself (Liddy *et al.*, 2013; Brasil, 2019). This conceptual distinction is decisive for understanding the role of teleinterconsultation in articulating and integrating health care networks. For the purposes of this review, the following operational definition is adopted: teleinterconsultation and teleconsultation (*teleconsultoria*) are treated as functionally equivalent modalities, as they share the interprofessional component mediated by information and communication technologies; e-consultation (e-consult) corresponds to the asynchronous modality of this same interprofessional communication, widely described in Canadian and North American literature; and telementoring, as exemplified by the Project ECHO model, although structurally distinct due to its collective and longitudinal format, was included because it

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Pages: 1-30

presents the same core component of interprofessional support for clinical decision-making in PHC. Normative documents and conceptual references on health care networks were used exclusively for theoretical contextualization and framing of the object of study, and are not treated as empirical evidence of effectiveness.

In Brazil, the implementation of the Telessaúde Brasil Redes Programme, established in 2007 and expanded in subsequent years, constitutes one of the main national teleinterconsultation experiences applied to PHC. Evidence from these initiatives indicates a reduction in unnecessary referrals to specialized care and an expansion of the resolvability capacity of Family Health Strategy teams (Colussi *et al.*, 2025). Internationally, programs such as Project ECHO, developed in the United States, as well as initiatives implemented in Europe and Canada, have reported similar results, with positive impacts on clinical support for primary care professionals and care quality improvement (Arora *et al.*, 2011; Liddy *et al.*, 2019).

Despite growing scientific interest and the expansion of practical experiences, the literature on teleinterconsultation presents methodological heterogeneity and relevant gaps. These limitations are particularly evident in the analysis of its contribution to health care network integration, in the measurement of long-term clinical outcomes, and in the identification of more effective implementation models (Ekeland *et al.*, 2010; Peeters *et al.*, 2024). In this context, conducting an integrative and critical synthesis of the available evidence becomes necessary to support managers, policymakers, and health professionals in the qualified adoption of this technology in health systems.

This review was guided by the research question formulated according to the PICo strategy (Population, phenomenon of Interest, and Context): What evidence exists on the impact of teleinterconsultation on the effectiveness of Primary Health Care and on health care network integration? The components of the question were defined as: (P) health professionals and teams working in PHC; (I) teleinterconsultation and related modalities of interprofessional telehealth; (Co)

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Pages: 1-30

health systems organized as care networks, with emphasis on the coordination and integration of levels of care.

2. METHODS

2.1 Study design

This is an integrative literature review, a methodological approach that allows the inclusion and analysis of studies with different designs, both experimental and non-experimental, related to the topic under investigation. This method enables the construction of a broad and critical understanding of the available state of knowledge, by integrating results from different methodological approaches (Whittemore; Knafl, 2005; Souza; Silva; Carvalho, 2010). The steps conducted were: problem identification and research question formulation; database searches; selection and assessment of eligible studies; data extraction and analysis; and synthesis and presentation of results.

2.2 Databases and search strategy

The bibliographic search was conducted in the following databases: PubMed/MEDLINE, Scopus, Web of Science, SciELO, and the Virtual Health Library (VHL). Searches were conducted between September and October 2025, using controlled descriptors and free terms combined with Boolean operators (AND, OR), in Portuguese, English, and Spanish. Reference management and duplicate removal were performed using Zotero software (version 7.0), with duplicates identified automatically by the platform and reviewed manually by the authors before screening.

The descriptors used, according to the DeCS (Health Sciences Descriptors) and MeSH (Medical Subject Headings) controlled vocabularies, were: telehealth; telemedicine; teleconsultation; e-consultation; telementoring; teleconsultoria; teleinterconsulta; primary health care; primary care; family medicine; health care

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Pages: 1-30

networks; integrated health systems; care coordination; referral and consultation; specialist consultation; inter-professional communication.

The search strategy used in PubMed was: ("telehealth"[MeSH] OR "telemedicine"[MeSH] OR "teleconsultation"[tiab] OR "e-consultation"[tiab] OR "telementoring"[tiab]) AND ("primary health care"[MeSH] OR "primary care"[tiab] OR "family medicine"[tiab]) AND ("referral and consultation"[MeSH] OR "care coordination"[tiab] OR "health networks"[tiab] OR "integrated care"[tiab]). Equivalent strategies were adapted to the other databases, with adjustments to the syntax and controlled vocabularies of each platform (Emtree in Scopus; DeCS in SciELO and VHL). Complete strategies for each database are available in Appendix A (Supplementary Material).

2.3 Inclusion and exclusion criteria

Primary and secondary studies were included that: (a) addressed teleinterconsultation, teleconsultation, or similar interprofessional telehealth modalities; (b) were set in PHC or health systems with emphasis on care network coordination and integration; (c) evaluated outcomes related to resolvability, referrals, care coordination, care integration, continuing education, or implementation barriers; (d) were published preferably between 2014 and 2025 — seminal studies published prior to this period were included when they represented foundational references for the field, with explicit justification; (e) were available in full text, in Portuguese, English, or Spanish.

Excluded were: (a) studies addressing exclusively direct patient teleconsultation, without an interprofessional component; (b) studies focused exclusively on diagnostic imaging technologies (teleradiology, telepathology) without a PHC context; (c) case reports without systematized data; (d) editorials, letters, and comments without original data; (e) studies without peer review.

2.4 Study selection process

REMUNOM
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Pages: 1-30

Studies were selected in three stages: (1) title and abstract screening by two independent reviewers, based on inclusion and exclusion criteria; (2) full-text reading of pre-selected studies; (3) resolution of disagreements by an independent third reviewer, engaged whenever the two primary reviewers did not reach agreement. At the title and abstract screening stage, the agreement rate between primary reviewers was 91.3%, with discordant cases submitted to the third reviewer for final decision. The selection process followed the PRISMA 2020 flowchart recommendations (Page *et al*., 2021). Methodological quality assessment was conducted based on JBI Critical Appraisal Tools (Moola *et al*., 2020), adapted to the design of each study: for prevalence/cross-sectional studies, the JBI Checklist for Prevalence Studies was used; for systematic reviews, the JBI Critical Appraisal Checklist for Systematic Reviews; for cohort and quasi-experimental studies, the respective JBI instruments for cohort studies and non-randomized controlled studies; and for narrative reviews, the JBI instrument for narrative reviews. The results of this assessment are presented in Table 3. Table 1 presents the study selection flowchart.

2.5 Data extraction and synthesis of findings

Data extraction was performed using a standardized form containing: study identification (authors, year, country, design), objective, population/context, intervention, outcomes assessed, and main results. Synthesis was conducted through thematic content analysis, as proposed by Whittemore and Knafl (2005), with findings grouped into emerging thematic categories.

3. RESULTS

3.1 Characterization of included studies

The database search identified 692 records. After removing 143 duplicates, 549 references remained, of which 224 were selected for full-text reading. At the

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Pages: 1-30

end of the screening process, 11 studies met all inclusion criteria and were included in the review. Reasons for exclusion at the full-text reading stage included: exclusive focus on direct patient teleconsultation (n=58), absence of PHC or care network context (n=47), inadequate methodological design (n=32), unavailability of full text (n=23), language not covered by the criteria (n=12), and other combined reasons (n=41). The selection flowchart is summarized in Table 1.

Table 1. Study selection flowchart according to PRISMA 2020 recommendations (Page et al., 2021)

Phase	Stage	Reason / Note	n
Identification	Records identified in databases	PubMed/MEDLINE, Scopus, Web of Science, SciELO, VHL	692
Identification	Duplicates removed	—	143 removed
Screening	Records after duplicate removal	—	549
Screening	Excluded by title and abstract	Out of scope, no interprofessional component	325 excluded
Eligibility	Studies for full-text reading	—	224
Eligibility	Excluded after full-text reading	Direct patient teleconsultation (n=58); no PHC/network context (n=47); inadequate design (n=32); unavailable text (n=23); language (n=12); other (n=41)	213 excluded
Inclusion	Studies included in the review	—	11

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Pages: 1-30

Source: authors' own elaboration based on Page et al. (2021).

Regarding geographic distribution, the 11 included studies originate from Canada (n=3; 27.3%), Brazil (n=2; 18.2%), the United States (n=3; 27.3%), and the international/multicentre scope (n=3; 27.3%). Regarding methodological design, the following were identified: three systematic or narrative reviews (27.3%), two cohort or comparative studies (18.2%), two programme evaluation studies (18.2%), one quasi-experimental study (9.1%), one cross-sectional study (9.1%), one prospective pilot study (9.1%), and one critical narrative review (9.1%). Table 2 presents a summary characterization of the included studies.

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Pages: 1-30

Table 2. Summary characterization of studies included in the integrative review.

No.	Author(s)Year	Country	Design	Context/Specialty	Mainresults/Outcome
1	Arora et al. (2011)	USA	Quasi-experimental study	PHC / Hepatitis C (Project ECHO)	Clinical outcome equivalence: SVR 57.5% (PHC via ECHO) vs. 58.2% (in-person specialist). Formative effect on PHC professionals.
2	de la Torre-Díez et al. (2015)	Spain / International	Systematic review	PHC and multiple clinical areas	Cost-effectiveness and implementation barriers of telehealth services. Connectivity infrastructure as the main barrier in developing countries.
3	Ekeland et al. (2010)	International	Systematic review of reviews	PHC / Multiple clinical areas	General telehealth effectiveness: synthesis of systematic reviews. Methodological heterogeneity and need for outcome standardization.
4	Liddy et al. (2013)	Canada	Pilot/prospective cohort study	PHC / Multiple specialties (Champlain BASE eConsult)	Feasibility and acceptability of e-consultation system. Reduction of in-person referrals and positive feedback from family physicians.
5	Liddy et al. (2020)	Canada	Comparative/cohort study	PHC / Multiple specialties (Champlain BASE eConsult)	Equivalence in waiting time between telemedicine and in-person consultation. 38% of referrals avoided. Maintenance of care in PHC.

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Pages: 1-30

6	Liddy et al. (2019)	Canada	Multicentre cross-sectional study	PHC / 18 specialties (6,523 e-consultation requests)	49% of referrals avoided. Mean specialist response time: 1.7 business days. Satisfaction rate of 89% among requesting family physicians.
7	Colussi et al. (2025)	Brazil	Cross-sectional study	PHC / Telessaúde-SC	94.1% of teleconsultation requesters were Family Health Strategy physicians, family and community medicine physicians, or clinicians. Case resolution directly in PHC occurred in 48.1% of teleconsultations. 95.5% of professionals reported satisfaction or high satisfaction.
8	Schmitz and Harzheim (2017)	Brazil	Descriptive study based on retrospective data analysis	PHC	50.2% of requests evaluated; 95.6% satisfied; 88.4% reported their doubts fully answered. Referral avoidance in 34.8% of cases.
9	Peeters et al. (2024)	USA / International	Systematic review (72 studies)	PHC / Multiple specialties (family physician–hospital specialist e-consultation)	E-consultation associated with improved access to hospital care and reduction of in-person referrals. GRADE evidence quality: low to moderate.
10	Speyer et al. (2018)	International	Systematic review	PHC / Telehealth in dysphagia and other specific clinical presentations	Organizational barriers to telehealth: absence of protocols, professional resistance, and perceived burden on specialists. Need for methodological standardization.
11	Vimalananda et al. (2015)	USA	Critical narrative review (15 studies)	PHC / Endocrinology and Dermatology	Referral avoidability rate: 40–60%. Greater effectiveness with structured protocols. Lack of response standardization as the main weakness.

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Pages: 1-30

*Source: authors' own elaboration. * Seminal study published prior to the systematic search period (2014–2025), included due to its foundational relevance, with explicit justification in the Methods section.*

Table 3. Methodological quality assessment of included studies according to JBI Critical Appraisal Tools

REMUNOM
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DOI: 10.66104/3b52jz80
Pages: 1-30

Study	JBI instrument used	Main risk of bias	Methodological adequacy	Core limitations	Interpretive weight in synthesis
Arora et al. (2011)	JBI for non-randomized controlled studies (quasi-experimental)	No randomization; possible selection of more treatment-adherent patients	Adequate for primary outcome (SVR); well-defined concurrent comparator	Highly structured programme context; generalization to other models limited	High (objective clinical outcome)
de la Torre-Díez et al. (2015)	JBI for systematic reviews	Heterogeneity of primary studies; cost-effectiveness focus limits clinical generalization	Adequate for economic contextualization and barriers; search protocol described	Broad telehealth services included; specificity for interprofessional teleinterconsultation limited	Moderate (contextualization and barriers)
Ekeland et al. (2010)	JBI for systematic reviews (overview of reviews)	Very broad thematic scope; heterogeneity of included primary reviews	Methodologically robust as overview; rigour in selection of included reviews	Conclusions very generic; specificity for teleinterconsultation limited	Moderate (general telehealth framing)
Liddy et al. (2013)	JBI for prospective cohort studies (pilot)	Small sample (pilot phase); no comparator group; satisfaction bias possible	Adequate for feasibility study; prospective data collection	Preliminary results; insufficient statistical power for causal inferences	Limited (feasibility and acceptability)
Liddy et al. (2020)	JBI for comparative cohort studies	Non-random selection; potential indication bias (simpler cases sent to e-consultation)	Good: large sample; well-defined outcomes; electronic health record data	Restricted to Champlain BASE system; patient clinical outcomes not assessed	High (robust process outcomes)

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Liddy et al. (2019)	JBI for cross-sectional studies (multicentre)	Cross-sectional design limits causality; 'avoidable referral' criterion defined by specialist (possible bias)	Good: high coverage (18 specialties, 6,523 requests); systematic primary data	Sample restricted to Canadian high-structure context; no longitudinal follow-up	High (largest volume of primary data)
Colussi et al. (2025)	JBI for cross-sectional studies	Data from a single centre (Telessaúde-SC); possible regional selection bias; no control group	Good: large data volume (78,422 teleconsultations); detailed statistical analysis	Restricted to Santa Catarina state; patient clinical outcomes not measured	High (Brazilian context, process outcomes)
Schmitz and Harzheim (2017)	JBI for descriptive studies (retrospective production data analysis)	Retrospective production data; satisfaction assessment voluntary (50.2% response rate)	Adequate for describing supply and utilization; national system administrative data	Non-response bias in satisfaction assessment; no clinical outcome data	Moderate (Brazilian context, process)
Peeters et al. (2024)	JBI for systematic reviews	Heterogeneity of primary studies; GRADE quality low to moderate; focus on asynchronous e-consultation	High: rigorous (72 studies, GRADE, PROSPERO protocol); published in high-impact journal (JAMA)	Overall GRADE evidence quality low to moderate; clinical outcomes still insufficiently assessed	High (largest systematic review in corpus)
Speyer et al. (2018)	JBI for systematic reviews	Focus on specific clinical presentations (dysphagia); generalization to PHC broadly limited	Adequate for proposed scope; systematic identification of organizational barriers	Clinical specificity reduces direct applicability to teleinterconsultation in general PHC	Moderate (organizational barriers)
Vimalanand a et al. (2015)	JBI for narrative reviews	Narrative review without systematic protocol; possible bias in selection of the 15 included studies	Good: detailed critical analysis; identifies effect moderators (structured protocols)	No meta-analysis; avoidability estimates aggregated with methodological variability	Moderate (analytical synthesis with caution)

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Pages: 1-30

Source: authors' own elaboration based on JBI Critical Appraisal Tools (Moola et al., 2020). Interpretive weight: High = most robust evidence for this synthesis's conclusions; Moderate = interpreted with consideration of limitations; Limited = used for contextualization or feasibility, not for causal statements.

3.2 Thematic synthesis of findings

3.2.1 Impact on PHC resolvability

PHC resolvability can be defined as the capacity of care teams to respond effectively to the population's health needs, with adequate case management at the primary level of care, without the need for referral to specialized services. This outcome is one of the most frequently assessed in the included studies, and the analyzed evidence consistently indicates that teleinterconsultation contributes to expanding this capacity by providing specialized clinical support that facilitates decision-making and case management within PHC itself.

In the Brazilian context, Schmitz and Harzheim (2017) analyzed the supply and use of teleconsultations in the Telessaúde Brasil Redes Programme and found that 88.4% of queries were fully answered, indicating the effectiveness of the service in supporting PHC professionals. A similar result was reported by Colussi *et al.* (2025), who assessed 78,422 teleconsultations performed by the Telessaúde Centre at the Federal University of Santa Catarina between August 2023 and August 2024, finding that 48.1% of orientations indicated management within PHC, and that 95.5% of professionals were satisfied with the responses received.

Internationally, Liddy *et al.* (2020) assessed the Champlain BASE (Building Access to Specialists through e-Consultation) e-consultation programme in Canada and demonstrated that 38% of referrals were avoided after teleconsultation, with the family physician maintaining patient care within PHC. The systematic review by Peeters *et al.* (2024), based on 72 studies and published in JAMA Network Open, corroborated these findings by concluding that e-consultation is consistently

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Pages: 1-30

associated with improved access to specialized care and reduction of in-person referrals, although the overall quality of evidence is classified as low to moderate by the GRADE system.

3.2.2 Clinical decision support and care quality improvement

Clinical decision support is one of the most valued contributions of teleinterconsultation for PHC professionals. In contexts of high diagnostic or therapeutic complexity, rapid access to specialist opinion, without patient displacement, represents a substantial gain in care quality and safety (Vimalananda *et al*., 2015).

Project ECHO (Extension for Community Healthcare Outcomes), developed by Arora *et al.* (2011) at the University of New Mexico, demonstrated, in a quasi-experimental study involving 407 patients with hepatitis C, that clinical outcomes achieved by PHC physicians supervised through teleinterconsultation were equivalent to those obtained through in-person specialist care, with sustained virological response rates of 57.5% versus 58.2%, respectively. This finding constitutes high-impact evidence for the decentralization of complex care to PHC. This is a seminal study, published prior to the systematic search period, included due to its foundational relevance to the field.

Vimalananda *et al.* (2015) critically reviewed 15 studies on e-consultation models in the United States and found that teleconsultations were most effective when associated with structured communication protocols, language adapted to the PHC context, clear recommendations, and case follow-up mechanisms. The authors noted that the lack of response standardization constitutes one of the main weaknesses of teleinterconsultation systems.

In Brazil, the study by Colussi *et al.* (2025) found that 95.5% of PHC professionals rated teleconsultation quality positively, highlighting the speed and assertiveness of specialist responses — factors that contribute to safer and more

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DOI: 10.66104/3b52jz80
Pages: 1-30

effective care. Furthermore, a statistically significant association was observed between requesting professionals' satisfaction and the orientation towards PHC management, indicating that satisfaction was related to the possibility of case resolution at the primary level of care.

3.2.3 Reduction of avoidable referrals

The reduction of avoidable referrals constitutes the outcome with the largest volume of evidence in this review. Included studies indicate reduction rates ranging from 38% to 71%, depending on the specialty, context, and teleconsultation model adopted. Liddy *et al.* (2019), in a Canadian multicentre study involving 18 specialties and 6,523 e-consultation requests, found that in 49% of cases in-person referral was avoided, with a mean specialist response time of 1.7 business days and a satisfaction rate of 89% among requesting family physicians. The authors noted that the reduction was most pronounced in specialties with a high proportion of requests motivated by diagnostic or therapeutic queries, rather than specific procedures. It should be noted, however, that a reduction in referrals should not be automatically interpreted as a synonym for care quality. In adequately structured contexts, this reduction reflects greater PHC resolvability; in others, it may indicate under-referral, with potential diagnostic or therapeutic delay. The distinction between these scenarios requires systematic monitoring of patient clinical outcomes, an aspect still insufficiently explored in the teleinterconsultation literature.

In an aggregate analysis of 15 studies, Vimalananda *et al.* (2015) estimated that the referral avoidability rate through teleinterconsultation ranges from 40% to 60%, with evidence that this effect is maintained over time in structured and continuous services. The authors caution, however, that mere technological implementation, without change in organizational culture and defined care flows, does not guarantee these results.

3.2.4 Integration across levels of care and care coordination

REMUNOM
ISSN 2178-6925

Received: 13/03/2026 - **Accepted:** 13/05/2026
Vol: 13.09
DOI: 10.66104/3b52jz80
Pages: 1-30

The integration of care levels and care coordination constitute central dimensions for the organization of efficient and equitable health care networks (Mendes, 2010; WHO, 2016). It is important, however, to distinguish between two analytical planes: care coordination — understood as the punctual articulation between professionals from different levels for the resolution of specific cases — and systemic network integration, which presupposes broader dimensions, such as systems interoperability, longitudinal continuity, shared regulation, and bidirectional information flows. The studies included in this review provide more direct evidence about the former, contributing more indirectly to the understanding of the latter. Teleinterconsultation has demonstrated relevant potential to improve care coordination, from both the interprofessional communication and informational continuity perspectives, with indirect contributions to the systemic integration of networks.

Peeters *et al.* (2024), in a systematic review that analyzed 72 studies on e-consultations between family physicians and hospital specialists, concluded that e-consultation is associated with improved access to specialized care and reduction of unnecessary referrals. The authors highlighted that benefits are more robust when platforms are integrated into routine care flows and electronic health records.

In Brazil, Mendes (2010) highlighted teleinterconsultation as one of the instruments for integrating the Health Care Networks (HCN) provided for in the Brazilian Unified Health System (SUS) model, emphasizing its role in articulating care points and improving care flow. This perspective is supported by the study by Schmitz and Harzheim (2017), who analyzed the supply and use of teleconsultations within the Telessaúde Brasil Redes Programme and found that the service addresses a broad range of topics, providing specialized care support to PHC professionals, which may contribute to improved communication and integration between levels of care.

Liddy *et al.* (2020) found that family physicians reported greater access to patients' clinical histories and greater ability to follow case progress when

REMUNOM
ISSN 2178-6925

Received: 13/03/2026 - **Accepted:** 13/05/2026
Vol: 13.09
DOI: 10.66104/3b52jz80
Pages: 1-30

teleconsultations were integrated into the electronic health record, reinforcing that the quality of technological integration is a determining factor for the effectiveness of teleinterconsultation as a care coordination instrument.

3.2.5 Continuing education and professional development

Beyond the direct impacts on resolvability and referral reduction, teleinterconsultation has demonstrated relevant formative effects on PHC professionals, contributing to continuing health education and the development of clinical competencies at the primary level (Arora *et al*., 2011; Colussi *et al*., 2025).

Project ECHO is explicitly grounded in the 'communities of practice' model, in which PHC professionals learn from specialists during teleconsultations, progressively developing greater autonomy in managing complex conditions (Arora *et al*., 2011). Programme results demonstrated that, after six months of participation, PHC professionals showed a significant increase in knowledge about hepatitis C, with improvement in clinical competence scores and reduced dependence on specialist consultations for cases of moderate complexity.

In the Brazilian context, the study by Colussi *et al.* (2025) revealed that Telessaúde-SC teleconsultation promotes a longitudinal learning effect among PHC professionals. Teleconsultation contributes to continuous professional development, strengthening evidence-based decision-making and resolutive case management in Primary Care, which is consistent with a learning process and practical application of orientations in future clinical situations. This finding is consistent with what was observed by Schmitz and Harzheim (2017), who identified low general demand for teleconsultations in PHC, especially for topics previously addressed, which suggests a possible progressive absorption of specialized knowledge by PHC teams — a hypothesis compatible with the observed pattern of reduced repeated requests on the same topics. This finding is consistent with the longitudinal learning hypothesis, although prospective studies with objective clinical competence measures are needed to confirm it more robustly.

REMUNOM
ISSN 2178-6925

Received: 13/03/2026 - **Accepted:** 13/05/2026
Vol: 13.09
DOI: 10.66104/3b52jz80
Pages: 1-30

Liddy *et al.* (2020) noted that the educational character of teleinterconsultation is frequently underestimated in cost-effectiveness assessments, which tend to focus exclusively on referral reduction, neglecting the long-term impact on care quality and the autonomy of PHC teams.

3.2.6 Technical, organizational, ethical, and regulatory barriers

Despite favourable results, teleinterconsultation implementation faces substantial barriers at the technical, organizational, ethical, and regulatory levels, the overcoming of which is decisive for programme scale and sustainability (de la Torre-Díez *et al.*, 2015; Ekeland *et al.*, 2010).

At the technical level, de la Torre-Díez *et al.* (2015) identified that inadequate connectivity infrastructure, especially in remote regions and less favourable socioeconomic contexts, constitutes one of the main barriers to teleinterconsultation service implementation in developing countries. From an organizational perspective, Speyer *et al.* (2018), in a review on telehealth in different clinical presentations, found that the absence of teleinterconsultation integration into habitual care flows, the lack of clear operational protocols, and cultural resistance among health professionals are factors that reduce adherence and effectiveness of these programmes. The perception of increased workload among consulted specialists, associated with the absence of adequate financial incentives, was also described as a relevant limitation in different contexts (Liddy *et al.*, 2019; Vimalananda *et al.*, 2015).

Ethical and regulatory issues arise with particular relevance in the context of teleinterconsultation. Shared clinical responsibility, patient data confidentiality, informed consent, and the legal validity of remotely issued recommendations are topics not yet fully resolved in many health systems (Peeters *et al.*, 2024; Brasil, 2019). In Brazil, CFM Resolution No. 1,643/2002 and the subsequent Resolution No. 2,314/2022 established regulatory frameworks for telehealth, but

REMUNOM
ISSN 2178-6925

Received: 13/03/2026 - **Accepted:** 13/05/2026
Vol: 13.09
DOI: 10.66104/3b52jz80
Pages: 1-30

implementation gaps persist, especially regarding liability for harm resulting from teleconsultation-based conduct.

4. DISCUSSION

4.1 Critical analysis of results and literature convergences

The findings of this review reveal remarkable consistency among the included studies regarding the benefits of teleinterconsultation for PHC and health care network integration. The convergence of results in contexts as distinct as the Canadian health system (Liddy *et al*., 2019, 2020), the Brazilian SUS (Schmitz; Harzheim, 2017; Colussi *et al*., 2025), and the American system (Arora *et al*., 2011) lends robustness to this review's conclusions, even though methodological differences between studies require caution in generalizing quantitative data.

The reduction of avoidable referrals, with rates observed between 38% and 71% depending on context, represents the outcome with the largest volume of evidence. This convergence is particularly significant because avoidable referral constitutes a systemic problem in health systems, associated with increased costs, care fragmentation, long waiting lists, and user dissatisfaction (Mendes, 2010; WHO, 2016). Teleinterconsultation, by allowing PHC professionals to resolve clinical queries without transferring the patient to another level of care, acts directly on this problem.

The equivalence of clinical outcomes between teleinterconsultation-mediated care and in-person specialist care, demonstrated by Arora *et al.* (2011) in the context of hepatitis C, constitutes high-impact evidence for health policy. This finding suggests that, under certain clinical conditions, teleinterconsultation not only complements specialist care but can also replace it with comparable clinical efficacy, with significant gains in accessibility and costs.

4.2 Divergences and heterogeneity

REMUNOM
ISSN 2178-6925

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Vol: 13.09
DOI: 10.66104/3b52jz80
Pages: 1-30

Despite the convergence in main findings, the literature presents relevant heterogeneity. Referral reduction rates vary widely between studies, depending on the specialty involved, the level of service structure, professional training, and the criteria adopted to define a referral as avoidable (Liddy *et al*., 2019; Vimalananda *et al*., 2015).

The assessment of teleconsultation clinical quality and its effects on patient health outcomes remains limited in the literature. Most studies focus on process outcome analysis, such as the number of teleconsultations performed, referral rates, response time, and professional satisfaction. In contrast, investigations following patient clinical outcomes in the medium and long term are less frequent, revealing a relevant gap in scientific knowledge on the topic (Ekeland *et al*., 2010; Peeters *et al*., 2024).

Another relevant divergence concerns the role of electronic health records and interoperability between systems. While Liddy *et al.* (2020) and Peeters *et al.* (2024) demonstrated that technological integration is decisive for the effectiveness of teleinterconsultation in care coordination, other studies report good results even in contexts of low systemic integration, suggesting that human and organizational factors can overcome technological limitations in certain settings.

4.3 Implications for PHC and health systems

The evidence synthesized in this review has relevant practical implications for health policy formulation, care network management, and PHC service organization. Teleinterconsultation should be understood not as an isolated technology, but as a strategic component of a PHC-centred care model oriented by network integration (Mendes, 2010; WHO, 2016).

For the documented benefits to be achieved, implementation requires: (1) investment in adequate connectivity infrastructure, especially in rural and low-income contexts; (2) professional training and capacity building for effective use of

REMUNOM
ISSN 2178-6925

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Vol: 13.09
DOI: 10.66104/3b52jz80
Pages: 1-30

platforms and qualified interprofessional communication; (3) definition of clear protocols for requesting, responding, and following up; (4) integration with electronic health record systems and regulatory care network flows; (5) establishment of regulatory frameworks defining responsibilities, ensuring data security, and legitimizing remotely issued recommendations (Peeters *et al*., 2024; Brasil, 2019).

In the SUS context, teleinterconsultation presents particularly relevant potential given the historical challenge of access to specialized care, the country's continental dimensions, and the federative organization of the health system. The Telessaúde Brasil Redes experience demonstrates that large-scale programme implementation is feasible, with positive impact on PHC resolvability (Schmitz; Harzheim, 2017; Colussi *et al*., 2025). The sustainability of these programmes depends on adequate funding, shared governance among federal entities, and systematic outcome evaluation.

4.4 Study limitations

This review presents limitations that must be considered in interpreting the findings. The relatively small number of included studies (n=11) results from the rigorous application of eligibility criteria, particularly the requirement for an explicit interprofessional component, a PHC or care network context, and full-text availability. Of the 692 records identified, 325 were excluded at title and abstract screening for being out of scope or addressing exclusively direct patient teleconsultation; and 213 were excluded after full-text reading, as detailed in Table 1. This restrictive funnel, while ensuring greater thematic homogeneity of the corpus, limits the synthesis capacity and geographic representativeness of the analyzed evidence. Additionally, methodological heterogeneity between studies precluded the conduct of a quantitative meta-analysis, limiting the integration of results to a descriptive-interpretive thematic synthesis.

A geographic imbalance in research distribution is also observed, with a predominance of studies conducted in Canada and the United States and under-

REMUNOM
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Vol: 13.09
DOI: 10.66104/3b52jz80
Pages: 1-30

representation of low- and middle-income contexts outside Brazil. This geographic concentration restricts the transferability of evidence to different SUS realities, especially for rural, remote contexts with low digital integration or low specialist density available for teleconsultation. The evidence synthesized here should therefore be interpreted with caution when applied to Brazilian territories with precarious connectivity infrastructure or more fragmented federative organization. Finally, the possibility of publication bias cannot be ruled out, especially given the tendency for greater dissemination of positive results in the telehealth literature. The sustainability issue of teleinterconsultation programmes — including governance conditions, continued funding, and institutionalization — was insufficiently addressed in the included studies, which limits conclusions about the durability of observed benefits beyond pilot contexts or initiatives with strong local leadership.

Another aspect to consider concerns the inclusion of seminal studies published before the formal search period. This decision was made with explicit justification and methodological grounding; however, it represents a relaxation of the criteria originally established for study selection.

4.5 Knowledge gaps and future research perspectives

This review reveals relevant gaps that should guide future research agendas. The need for investigations with more robust methodological designs stands out, including randomized controlled trials and longitudinal studies with extended follow-up, capable of assessing the impact of teleinterconsultation on patient health outcomes in the medium and long term (Ekeland *et al*., 2010; Peeters *et al*., 2024).

The need for cost-effectiveness studies conducted with standardized methodologies, incorporating direct and indirect cost analysis, is also noted. These include the effects on professional learning and the repercussions on continuing health education — aspects relevant for supporting investment and planning decisions in health systems (de la Torre-Díez *et al*., 2015).

REMUNOM
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Vol: 13.09
DOI: 10.66104/3b52jz80
Pages: 1-30

Research investigating implementation models in low- and middle-income contexts, especially in Latin America, Africa, and Asia, is equally a priority for expanding the applicability of available evidence, currently produced predominantly in high-income countries (Liddy *et al.*, 2020; Peeters *et al.*, 2024). Studies on ethical, regulatory, and governance aspects, in different health systems, are also needed to support the construction of normative frameworks guiding the sustainable consolidation of these initiatives.

5. CONCLUSION

This integrative literature review demonstrated that teleinterconsultation constitutes a strategy with promising evidence of positive impact on PHC effectiveness and health care network coordination. Findings indicate a substantial reduction of avoidable referrals, expansion of PHC resolvability, strengthening of clinical decision support, improvement of care coordination, and relevant formative effects for the professionals involved. These results show convergence across different national and international contexts, lending consistency to this synthesis's conclusions for the process outcomes assessed.

It is important to distinguish, however, the strength of evidence according to the type of outcome assessed. For process outcomes — referral reduction, professional satisfaction, response time, and educational impact — evidence is more consistent and convergent across studies. For patient clinical outcomes in the medium and long term and for systemic network integration dimensions — such as interoperability, longitudinal continuity, and shared regulation — available evidence is still incipient, derived from few studies with recognized methodological limitations. The overall quality of evidence, classified by the GRADE system in some included studies as low to moderate, reinforces the need for cautious interpretation of conclusions and investment in more methodologically rigorous research.

REMUNOM
ISSN 2178-6925

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Vol: 13.09
DOI: 10.66104/3b52jz80
Pages: 1-30

For the documented benefits to translate into effective improvements in health systems, teleinterconsultation implementation must be accompanied by investments in infrastructure, professional training, technological integration, care protocolization, and adequate regulation. In the SUS context, teleinterconsultation represents a strategic instrument for consolidating PHC as the coordinator of care networks and for ensuring universal and equitable access to specialized care.

Future research should prioritize robust designs, assessment of long-term clinical outcomes, standardized cost-effectiveness analyses, and investigations of implementation models in low- and middle-income contexts, contributing to the continuous improvement of teleinterconsultation policies and practices in PHC.

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REMUNOM
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Artificial Intelligence Use Statement

The authors declare that artificial intelligence tools were used exclusively as linguistic support for reviewing clarity, textual organization, and grammatical refinement of the manuscript. All conceptual decisions, data analysis, interpretation of results, and final writing were performed by the authors, who assume full responsibility for the scientific content presented.