Synergy between the more doctors program and COAPES in building a local Development Flow

Sinergia entre o programa mais médicos e COAPES na construção de um fluxo de Desenvolvimento Local

Sinergia del programa más doctores y coapes en la construcción de un flujo de desarrollo local

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Abstract: In recent decades, Brazil has invested in public policies aimed at qualifying basic care and health training, such as the Mais Médicos Program (PMM) and the Education-Health Public Action Organizational Contracts (COAPES), especially in territories marked by social vulnerabilities. The problem of this study lies in the analysis of the effectiveness of these initiatives in promoting local development. The central objective is to understand how the articulation between PMM and COAPES contributes to expanding access to health, as well as describing the flow of development generated by the effects of this integration. The research adopts a qualitative approach, an analytical method, with bibliographic review and documentary analysis, using the municipality of Canindé (CE) as a reference. The results show that the synergy between PMM and COAPES drives the construction of a flow of local development, promoting training practices integrated into the community reality, improvements in health services and greater social participation. Such policies operate as structuring elements of a "DNA of local development", by strengthening teaching-service-community integration and stimulating collaborative networks that contribute to more equitable, resolute and humanized care.

Keywords: COAPES; local development; more doctors program; public policies.

Resumo: Nas últimas décadas, o Brasil tem investido em políticas públicas voltadas à qualificação da atenção básica e à formação em saúde, como o Programa Mais Médicos (PMM) e os Contratos Organizativos de Ação Pública Ensino-Saúde (COAPES), especialmente em territórios marcados por vulnerabilidades sociais. A problemática deste estudo reside na análise da efetividade dessas iniciativas na promoção do desenvolvimento local. O objetivo central é compreender como a articulação entre PMM e COAPES, contribui para ampliar o acesso à saúde, assim como descrever o fluxo de desenvolvimento gerado pelos efeitos dessa integração. A pesquisa adota a abordagem qualitativa, método analítico, com revisão bibliográfica e análise documental, tendo como referência o município de Canindé (CE). Os resultados evidenciam que a sinergia entre PMM e COAPES impulsiona a construção de um fluxo de desenvolvimento local, promovendo práticas formativas integradas à realidade comunitária, melhorias nos serviços de saúde e maior participação social. Tais políticas operam como elementos estruturantes de um "DNA do desenvolvimento local", ao fortalecer a integração ensino-serviço-comunidade e estimular redes colaborativas que contribuem para um cuidado mais equitativo, resolutivo e humanizado.

Palavras-chave: COAPES; desenvolvimento local; programa mais médicos; políticas públicas.

Resumen: En las últimas décadas, Brasil ha invertido en políticas públicas destinadas a calificar la atención básica y la formación en salud, como el Programa Mais Médicos (PMM) y los Contratos Organizativos de Acción Pública Educación-Salud (COAPES), especialmente en territorios marcados por vulnerabilidades sociales. El problema de este estudio radica en el análisis de la efectividad de estas iniciativas en la promoción del desarrollo local. El objetivo central es comprender cómo la articulación entre el PMM y COAPES contribuye a ampliar el acceso a la salud, así como describir el flujo de desarrollo generado por los efectos de esta integración. La investigación adopta un enfoque cualitativo, método analítico, con revisión bibliográfica y análisis documental, tomando como referencia el municipio de Canindé (CE). Los resultados muestran que

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la sinergia entre el PMM y COAPES impulsa la construcción de un flujo de desarrollo local, promoviendo prácticas de formación integradas a la realidad comunitaria, mejoras en los servicios de salud y mayor participación social. Tales políticas operan como elementos estructurantes de un "ADN del desarrollo local", al fortalecer la integración enseñanza-servicio-comunidad y estimular redes de colaboración que contribuyan a una atención más equitativa, resolutiva y humanizada.

Palabras clave: COAPES; desarrollo local; programa más medicos; políticas públicas.

1 INTRODUCTION

In a global context marked by inequalities and challenges in accessing essential services, healthcare stands out as a key driver of local development, particularly in Brazil, where regional disparities have a direct impact on quality of life. In this scenario, the integration between the More Doctors Program, in Portuguese, Programa Mais Médicos (PMM), which deploys qualified professionals to underserved areas, and the Organizational Contracts for Public Action in Education and Health, in Portuguese, Contratos Organizativos da Ação Pública Ensino-Saúde (COAPES), which strengthen infrastructure and workforce training, emerges as a crucial strategy for reducing disparities and broadening access to health services. This synergy positively influences the well-being of vulnerable communities, contributing to a more equitable and efficient healthcare system aligned with local needs and regional development.

Established by Interministerial Ordinance No. 1.369 (Brasil, 2013a), the PMM seeks to expand access to medical care in underserved regions, especially in rural areas and the outskirts of major urban centers. By hiring both Brazilian and foreign physicians, the program aimed to fill workforce gaps and strengthen the public health network. In turn, COAPES has emerged as a strategic tool for bridging education, healthcare services, and community engagement within the framework of Brazil's Unified Health System (SUS), as instituted by Interministerial Ordinance No. 1.124 (Brasil, 2015). By fostering integration between academic institutions and healthcare services, COAPES contributes to workforce training, research development, and infrastructure modernization.

While previous studies have demonstrated measurable benefits from health-related actions and investments, there remains a significant gap in research addressing the non-measurable outcomes that arise from the interaction of these initiatives, particularly through partnerships among private and public entities and civil society. This gap stems in part from the difficulty in quantifying and evaluating elements such as social cohesion, investment efficacy, improvements in quality of life, and the dissemination of outcomes, factors that shape the social fabric and population well-being, but which are not always captured by conventional indicators.

In this regard, applying a qualitative approach grounded in an analytical method makes it possible to identify traditionally measurable health outcomes while also interpreting intangible elements that influence local development. Through a descriptive literature review, one can gather and organize insights that demonstrate how investments in healthcare resonate across socioeconomic conditions, employment opportunities, and territorial cohesion. Analyzing these benefits through a qualitative lens helps deepen understanding of the connections between health and development, providing broader support for the formulation of integrated and context-sensitive public policies.

Given the crucial health initiatives mentioned, the convergence between PMM and COAPES investments represents fertile ground for analyzing the synergistic impact of these

programs on local development. The aim of this research is to understand how coordination between the actions of the More Doctors Program (PMM) and investments promoted through the Organizational Contracts for Public Action in Education and Health (COAPES) contributes to expanding qualified access to health services. More specifically, the study seeks to describe the development flow generated by the positive effects of this integration, particularly in inland municipalities such as Canindé, Ceará, Brazil.

By unveiling this coordination, the study seeks to support a deeper understanding of the mechanisms that drive local development through the expansion of access to quality health services and to offer contributions for the formulation of more effective public policies and the optimization of health-related investments.

The manuscript is structured into eight sections to facilitate a comprehensive analysis of the proposed framework. Following this introduction, Section 2 provides a detailed overview of the More Doctors Program (PMM), while Section 3 examines the framework of the Organizational Contracts for Public Action in Education and Health (COAPES). Section 4 establishes the theoretical foundations of local development. Section 5 presents the qualitative methodology and describes the study area. The interactions between PMM and COAPES are analyzed in Section 6, followed by the presentation and discussion of results in Section 7. Finally, Section 8 offers concluding remarks and policy implications.

2 MORE DOCTORS PROGRAM

The "More Doctors" Program (PMM), launched in 2013 by the Brazilian Federal Government, is an initiative aimed at addressing the shortage of medical professionals in vulnerable regions and expanding access to healthcare, especially in remote and underserved areas. Established by Law No. 12,871/2013, the program seeks to reduce regional disparities in physician distribution by ensuring medical care for populations in rural municipalities, urban outskirts, and Indigenous territories (Brasil, 2013b). PMM is structured around three main pillars: the emergency provision of physicians, the expansion of healthcare facility infrastructure, and the increase in medical school and residency positions.

One of PMM's core components was the emergency deployment of professionals to regions with a shortage of doctors, ensuring their presence in areas where medical services were insufficient or nonexistent. This measure aimed to meet the immediate demand for healthcare, particularly in primary care, which serves as the entry point to Brazil's Unified Health System (SUS). The presence of these physicians contributed to improved health indicators, such as an increase in the number of consultations, a reduction in infant mortality, and expanded access to basic procedures in underserved municipalities (Pinto *et al*., 2014). Additionally, the program strengthened the connection between health services and communities, promoting a more humanized and context-sensitive approach to medical practice.

Another key aspect of PMM was its investment in expanding and improving medical education in Brazil. The program encouraged the creation of new medical school positions, focusing on public institutions and regions with lower physician density, and expanded residency opportunities in priority areas such as family health and primary care (Brasil, 2013b). This strategy aimed not only to meet immediate demand but also to build a foundation of well-trained professionals committed to SUS principles and aligned with the population's needs and the realities of Brazil's healthcare system.

Despite its progress, PMM faced challenges, such as the need to improve healthcare infrastructure, ensure the retention of professionals in remote regions, and foster stronger integration between physicians and the communities they served (Soares Neto *et al*., 2016). The program's partial discontinuation in 2018 raised concerns about the future of healthcare in vulnerable areas. Nevertheless, the legacy of "More Doctors" includes the strengthening of primary care, the reduction of healthcare access inequalities, and the consolidation of a public policy that prioritized equity and universality within SUS (Pinto *et al*., 2014).

The creation of private medical schools under the PMM framework contributed to the expansion of medical education in Brazil, particularly in regions with lower professional density. By establishing partnerships with private institutions, the program broadened access to medical training, enabling more students to enroll in medical programs (Brasil, 2013a).

This expansion helped democratize access to medical education and fostered economic and social development in the areas where these institutions were established. Many private schools adopted curricula aligned with PMM guidelines, emphasizing primary care and the needs of SUS, thereby contributing to the training of professionals better prepared to work in socially vulnerable contexts (Soares Neto *et al*., 2016).

3 COAPES

According to Interministerial Ordinance No. 1.124 (Brasil, 2015), the Organizational Contracts for Public Action in Education and Health (COAPES) are initiatives and guidelines for establishing agreements aimed at strengthening the integration between education, healthcare services, and communities within Brazil's Unified Health System (SUS). Their goal is to ensure comprehensive training of healthcare professionals, aligned with the population's needs and SUS principles (Brasil, 2015).

COAPES are collaborative management tools designed to integrate Brazil's health and education networks, fostering coordination between educational institutions and healthcare services. These contracts, established by Interministerial Ordinance No. 1.124, also aim to strengthen SUS and improve the training of healthcare professionals by aligning system needs with educational practices (Brasil, 2015). COAPES seek to ensure that teaching, research, and outreach activities are aligned with local health demands, enhancing service quality and preparing professionals to work within SUS.

Studies show that COAPES help reduce regional health disparities. Girardi *et al*. (2016) demonstrated that municipalities with these contracts saw an increase in internship opportunities in remote areas. Ramos and Brehmer (2014) emphasized that these agreements have encouraged educational institutions to adapt their curricula and clinical practices to local contexts, ensuring more contextualized training aligned with SUS demands. However, challenges remain, such as the need for coordination among involved sectors and the provision of adequate financial resources and infrastructure for contract implementation. The effectiveness of COAPES therefore depends on political commitment, management capacity of stakeholders, and the active participation of healthcare professionals in the process.

COAPES represents an innovative strategy for integrating education and healthcare, with the potential to transform both professional training and the quality of care provided within SUS. Despite the challenges, their implementation is seen as progress in consolidating public policies

that aim to align health system needs with educational practices, contributing to the development of a more equitable and efficient healthcare system (Brasil, 2015; Pereira, 2024). The continuity and strengthening of these contracts rely on collective effort and sustained commitment to the integration of education and health.

4 LOCAL DEVELOPMENT

The coordination between sectoral programs, such as those aimed at promoting business, education, and health, and territorial governance instruments has increasingly proven to be an effective strategy for strengthening local development. Recent studies show that the successful formulation of municipal public policies depends on an accurate diagnosis of the population's needs and the ability of local governments to align their actions with the socio-territorial specificities of each region (Hermelin; Trygg, 2021).

In this context, endogenous development emerges as a central paradigm, grounded in the mobilization of local actors, private enterprises, civil society, and public institutions working in an integrated manner to foster sustainable change. The endogenous perspective values internal territorial resources, such as traditional knowledge, social capital, and cultural practices, and acknowledges that progress does not rely solely on external investments, but rather on the organizational capacity and innovative potential of local stakeholders themselves (Nader; Viana; Valle, 2025).

In the Brazilian case, territorial diversity and the breadth of social demands call for multi-scalar and cross-sectoral approaches. Health governance, for instance, has been structured through cooperation among different levels of government and sectors of society, with health councils standing out as key spaces for co-management and social participation (OECD, 2021). This configuration promotes decision-making decentralization, enhances transparency, and strengthens local support systems, making them more responsive to metropolitan and regional challenges (Massuda *et al*., 2023).

Education, in turn, plays a strategic role in consolidating local development by fostering community empowerment and cultivating leadership capable of driving transformative processes. Recognizing education as a vector of endogenous development helps break the dependency on exogenous solutions and reinforces territorial autonomy in shaping their own developmental paths (Kurniawan *et al*., 2023).

Thus, sustainable local development requires the construction of flexible institutional arrangements grounded in principles of collaborative governance, civic participation, and integrated public policy. The adoption of integrated territorial strategies, such as those outlined in Policy Objective 5 of the European Union's Cohesion Policy, offers an inspiring model for Brazil by promoting coordinated actions across sectors and scales, with a focus on equity, resilience, and social inclusion (UNDP, 2025).

In this context, a 2024 report by Repórter Ceará highlights the expansion of access to medical education for local and traditional communities, illustrated by the journey of the first Kanindé Indigenous person to study medicine. His entry into university through affirmative action policies demonstrates how medical education can transform reality by offering opportunities to historically underserved populations (Reporter Ceará, 2024). The training of local professionals strengthens healthcare in their communities, promoting care that is more attuned to the cultural

and social needs of these groups. This achievement reinforces the positive impact of public policies that expand access to higher education in disadvantaged regions.

The possibility for local residents to study medicine in their own cities represents progress in access to higher education and improvements in public health. By offering medical programs in regions far from major urban centers, the retention of healthcare professionals in these areas is encouraged, helping to reduce inequality in medical care and enhance the value of local health services. This initiative fosters regional development, strengthens educational and research institutions, and creates new job opportunities. Training doctors who are closely connected to their communities allows for more humane and effective care, with a deeper understanding of each region's specific needs and characteristics.

5 METHODOLOGY

This study is based on a qualitative, descriptive approach, grounded in bibliographic and documentary review, guided by an analytical method. The qualitative approach is particularly suitable for understanding complex, subjective, and contextualized phenomena, such as those related to public health policies and their interface with education. The analytical method was employed to break down the constituent elements of the public policies analyzed, namely, the "More Doctors" Program (PMM) and the Organizational Contracts for Public Action in Education and Health (COAPES), with the aim of understanding their interrelations, implications, and impacts in the local context. According to Marconi and Lakatos (2021), the analytical method allows for a critical examination of a phenomenon's components by isolating variables and structures to identify patterns and causal relationships.

The descriptive bibliographic review was a central stage of the research, responsible for systematizing existing knowledge on the topic. According to Gil (2022), this type of review aims to gather, select, and critically describe the main scientific works on a given subject, offering a consolidated overview of available theoretical and empirical approaches. Academic publications were analyzed using databases such as SciELO, PubMed, and Google Scholar, focusing on studies addressing the implementation, outcomes, and challenges of PMM and COAPES. Keywords included "More Doctors Program", "COAPES", "education-service integration", and "local development".

The bibliographic search and documentary analysis covered a period from 2013 to 2025, aligning with the implementation of the More Doctors Program (PMM) and the subsequent establishment of COAPES. The selection criteria included academic articles, technical reports, and institutional documents published in Portuguese, English, and Spanish, ensuring a comprehensive understanding of the international and local impacts of these health policies.

In addition to academic literature, documentary analysis was conducted through a systematic survey, selection, and interpretation of institutional, regulatory, and administrative documents. Laws, ordinances, reports, and guidelines issued by the Ministry of Health and other government bodies were consulted, especially Law No. 12.871 (Brasil, 2013b) and Interministerial Ordinance No. 1.124 (Brasil, 2015). Documents accessed via official websites such as www.gov.br/saude were used to understand the regulatory framework and operationalization of these policies.

As a complement, local institutional sources were examined, including municipal websites and regional news outlets such as the Canindé/CE City Hall portal. These sources provided

information related to the local implementation of policies, including quantitative and qualitative evidence on the social and institutional impacts of the actions carried out. The data analysis process followed the principles of Qualitative Content Analysis, specifically employing a thematic analysis technique. The definition of thematic categories occurred through a hybrid approach: initially, primary categories such as 'education-service integration' and 'local development' were established deductively based on the theoretical framework and the PMM/COAPES regulatory guidelines. Subsequently, subcategories were refined inductively during the systematic reading of the collected documents and literature, allowing for the emergence of nuanced patterns specific to the Canindé context. The organization and coding of the data were performed manually, involving cross-referencing between institutional reports and academic literature to ensure internal validity. This rigorous process allowed for the breakdown of the public policies' constituent elements to identify causal relationships and socio-economic patterns.

Ethical Considerations: Since this study relied exclusively on public domain documentary sources and a literature review, without involving primary data collection from human participants or animals, it was exempt from institutional review board approval and informed consent requirements. The research followed ethical standards of transparency and integrity in data handling.

5.1 Characterization of the Study Location

The municipality of Canindé, located in the central hinterland of Ceará, stands out for its cultural and religious significance, being one of the main faith tourism destinations in the Northeast. With an estimated population of 78,000 and a territorial area of 3,218 km², it has a Municipal Human Development Index (MHDI) of 0.612, reflecting the socioeconomic challenges typical of Brazil's semi-arid region (IBGE, 2022; IPECE, 2023). The local economy is based on livestock farming, subsistence agriculture, and religious tourism, with growing investment in urban infrastructure and public services (Canindé, 2025).

The establishment of the Estácio IDOMED Medical School in Canindé occurred through a Ministry of Education public call in 2017, as part of the policy to expand higher education in health to interior regions (OKariri, 2017). Aligned with the PMM, the institution began operations in 2020 with 50 seats per semester, with plans to expand to 150. In partnership with the municipal government via COAPES, it promotes education-service-community integration, offering practical training within the public health network. A medical residency program was also announced, aiming to retain professionals in the region (Revista Central, 2020).

Canindé's participation in the "More Doctors" Program (PMM) contributed to expanding primary care coverage and reducing inequalities in access to healthcare. The presence of professionals has been essential for improving care quality, especially in rural areas, and for implementing more effective clinical protocols (Girardi *et al*., 2016).

The synergy between health and education policies has generated positive impacts on local development. The approval of the 2025 Annual Budget Law allocated R$ 87.4 million to health and R$ 156.2 million to education, highlighting the prioritization of these sectors (C4 Notícias, 2024). The resumption of educational infrastructure projects, with investments exceeding R$ 16 million, created over 700 direct and indirect jobs, expanding access to education and stimulating the local economy (Canindé, 2025). These data demonstrate how the integration of public policies and institutional arrangements can promote sustainable and inclusive territorial development.

6 INTERACTIONS OF PMM AND COAPES IN LOCAL DEVELOPMENT

The coordination between the "More Doctors" Program (PMM) and the Organizational Contracts for Public Action in Education and Health (COAPES) has become a key strategy for enhancing healthcare training and driving local development, especially in more vulnerable regions. By integrating theory and practice, these policies bring students closer to the realities of Brazil's Unified Health System (SUS) and community needs. PMM expanded access to medical education with a focus on primary care, while COAPES strengthened the integration between universities and health services, promoting training in real and socially vulnerable settings.

The integration between health education and services provided in local communities has been a cornerstone for training professionals aligned with SUS principles. The study by Negrini and Rossit (2024) highlights that PMM and COAPES foster learning environments that connect students to community realities, enhancing medical education through more humanized and contextualized practices. Active community involvement, combined with student participation in the daily operations of health services, ensures more equitable and effective care, reinforcing the impact of public policies that link education, service, and community within SUS.

COAPES has encouraged the creation of integrated networks that bring together healthcare workers, managers, users, and students, promoting knowledge exchange among various system actors. This coordination strengthens professional training and improves service quality, enhancing care practices and contributing to the development of a more efficient and humanized healthcare system (Negrini; Rossit, 2024). Additionally, PMM has increased access to health services, reducing barriers and inequalities that traditionally limited care for the population. Policies and strategies implemented by the program have contributed to greater equity in the healthcare system, facilitating access and reducing waiting times (Girardi *et al*., 2016).

Improving the infrastructure of hospitals and clinics is another positive impact of these policies. For example, the donation of 30 air conditioning units by Estácio Medical School in Canindé to a local health facility aimed to improve thermal comfort and working conditions for professionals (Canindé, 2023a). Other essential equipment was also provided, including a portable ultrasound with tablet, printer, computer, and desk (Postagem na página do Instagram da Santa Casa de Canindé, @santacasadecaninde, em 17 fev. 2025). These actions demonstrate how partnerships between educational institutions and health services can contribute to the modernization and humanization of healthcare units, reinforcing the importance of infrastructure investment for strengthening SUS.

The population growth in Canindé, according to data from the Brazilian Institute of Geography and Statistics (IBGE), reflects local development driven by improvements in infrastructure, public services, and economic opportunities. Educations in areas such as health, education, and transportation, combined with initiatives like PMM and COAPES, have contributed to better quality of life and stronger primary care.

Partnerships with private medical education institutions, such as Estácio IDOMED in Canindé, have supported the expansion of medical residency programs in priority areas like family health and primary care, aligned with SUS needs. These initiatives increase opportunities for specialized medical training and strengthen local healthcare, ensuring the presence of qualified professionals in underserved regions (Canindé, 2023b). Additionally, training sessions offered by institutions like IDOMED Canindé on topics such as patient reception and humanization in SUS play a key role in improving healthcare professionals' skills and service quality.

Medical students also have a significant positive impact on the communities where they work, going beyond academic training to contribute to social and humanitarian actions. A notable example is the participation of scientific initiation scholarship students (PIBIC-IDOMED) in the Canindé pilgrimage, where they carried out health promotion and education activities for pilgrims. This initiative demonstrates the students' commitment to the community and the importance of outreach activities in shaping more humanized and socially responsible professionals (Neves *et al*., 2023). Other initiatives include donating drinking water to underserved communities and organizing fundraising campaigns for vulnerable populations, such as the Quilombola Community of Benfica. These actions reinforce the integration between education and community promoted by programs like PMM and COAPES, encouraging students to engage with local realities and develop empathy and solidarity (Jornal do Comércio do Ceará, 2023).

The establishment of medical schools linked to PMM represents a significant advancement in strengthening SUS and promoting local development. These institutions not only expand access to medical education in underserved regions but also commit to transferring R$ 1.5 billion to SUS by 2027, funds that will be reinvested in infrastructure, equipment, and service improvements. This initiative strengthens primary care and fosters the socioeconomic development of local communities (Koike, 2025).

Clearly, PMM and COAPES have played a crucial role in improving access to and quality of healthcare, contributing to local development. These public policies strengthen primary care, promote the training of more skilled and humanized professionals, and encourage the integration of education, service, and community.

7 RESULTS AND DISCUSSION

The positive impacts of the synergy between the "More Doctors" Program (PMM) and the Organizational Contracts for Public Action in Education and Health (COAPES) represent a significant advancement for Brazil's Unified Health System (SUS). This strategic combination ensures the presence of physicians in underserved regions while simultaneously enhancing the training of healthcare professionals. By establishing medical education initiatives in remote areas, it helps expand the population's access to quality healthcare services. COAPES, by promoting the integration of education and service, ensures that future doctors receive more comprehensive training aligned with the population's needs. The synergy between these two initiatives is essential for strengthening SUS and reducing regional inequalities. Their integration is the outcome of both programs.

The coordination between education and healthcare services is fundamental to ensuring that public health policies are effective and sustainable, promoting professional training aligned with SUS needs. This synergy allows physicians and students to share knowledge and experiences, creating a mutual learning environment that contributes to improving the quality of care provided to the population (Soares Neto; Machado; Alves, 2016). Moreover, the presence of more qualified doctors in underserved areas strengthens regional health systems and stimulates local development, promoting more effective and humanized care. This integration, as Aquiles et al. (2017) point out, reinforces the importance of public policies that link education, service, and community, generating positive impacts both in professional training and in the well-being of the populations served.

This partnership has been crucial for expanding access to healthcare, improving the quality of services, and strengthening the training of healthcare professionals. These initiatives represent a successful model for improving and expanding SUS services and reducing social health inequalities in Brazil. The combination of these two strategies demonstrates a shared commitment to ensuring the right to health for all Brazilians. This dynamic has proven to be a catalyst for local development, as the synergy between these initiatives has generated positive impacts across various sectors, including the economy, tourism, hospitality, commerce, and the community, boosting growth and quality of life.

The arrival of medical students and healthcare professionals in underserved regions has provided more equitable access to healthcare by promoting health and solidarity actions that help address the population's needs. This improvement in quality of life directly leads to increased life expectancy and workforce productivity, driving the local economy. Pinto *et al*. (2014) emphasize that PMM has been essential in reducing inequalities in access to healthcare, especially in remote and underserved areas. Furthermore, Aquiles *et al*. (2017) reinforce that the joint efforts of students and healthcare professionals through COAPES strengthen primary care and promote the development of local dialogue and agreements, making the process more sustainable and inclusive.

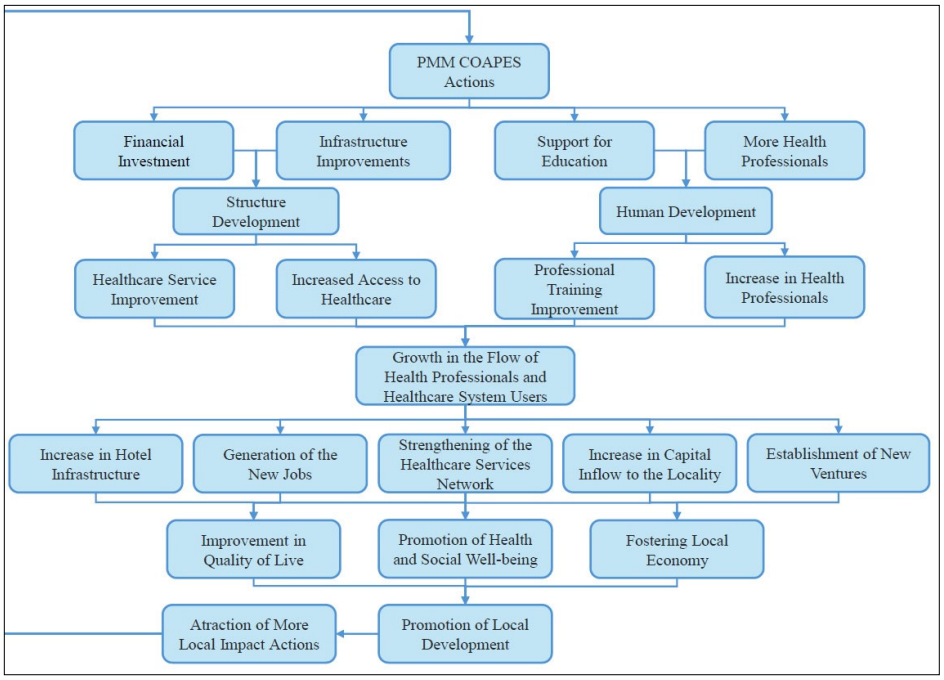
Beyond the health benefits, the presence of healthcare professionals in remote areas stimulates the development of other sectors. The demand for healthcare services, along with the number of students and professionals working in these areas, creates a need for infrastructure such as increased hotel capacity, housing construction, commercial expansion, and especially the building and improvement of hospitals and clinics, which drives the construction industry and job creation.

The presence of students, doctors, professionals from various fields, and their families also increases demand for services such as food, transportation, and education, boosting local commerce and stimulating the economy. Tourism also benefits from the influx of people into these territorial dynamics, as improvements in quality of life and the appreciation of local heritage attract visitors, generating income for the population and promoting the development of tourism activities.

COAPES, in turn, plays a fundamental role in fostering and supporting the development and investment in community health actions and infrastructure, strongly complementing the benefits brought by PMM. Through initiatives such as investments in health unit infrastructure, professional development courses for healthcare workers, and support for teaching, research, and outreach projects, COAPES contributes to improving the population's quality of life and the local development of communities.

The combination of PMM and COAPES investments has proven to be an effective strategy for promoting local development and enhancing quality of life in various regions of the country. The impact of these initiatives spans across health, economy, tourism, hospitality, commerce, and community, generating a virtuous cycle of growth and collective well-being illustrated in Figure 1.

Figure 1 – Flow of Impact of PMM and COAPES on Local Development



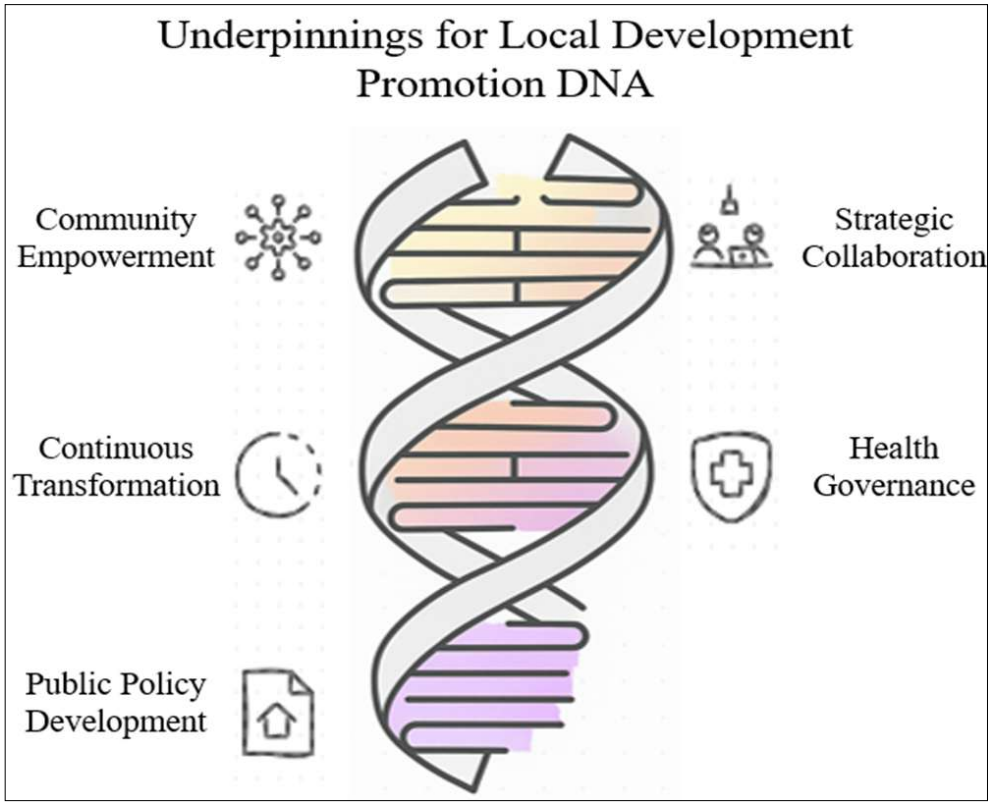
Source: elaborated by the authors, 2025.

The schematic representation of the integration between the More Doctors Program (PMM) and COAPES illustrates how well-structured public and private investments in healthcare can serve as powerful vectors for socioeconomic transformation. The coordination among the creation of new health education institutions, professional training, community-based health initiatives, and the integration of teaching with practice promotes infrastructure investment and job creation, establishing a sustainable development model that generates benefits in healthcare delivery and the local economy.

This structure, captured through the diagram, depicts the flow of actions and highlights the complexity and interdependence of the elements that shape the healthcare system and its impact on local development. By observing this integration more organically, it becomes possible to correlate the actions driving socioeconomic transformation fostered by PMM and COAPES with the interwoven strands of a "DNA," which combine and complement each other to encode the instructions used for the development and functioning of all living organisms.

This synergy marks a milestone in the history of Brazilian public healthcare, driving profound transformation in medical education and primary care delivery. When examined through the lens of local development, an intriguing analogy emerges between this relationship and biological evolution, particularly the structure of DNA. Just as DNA contains the genetic information that defines living organisms, PMM and COAPES may be seen as vital and complementary parts of a "health education-service integration DNA" for promoting local development. They lay the groundwork for community empowerment, continuous transformation, strategic collaboration, health governance, and policy development. Figure 2 thus illustrates the DNA analogy formed by the foundational elements of local development promotion.

Figure 2 – DNA of Foundational Bases for Local Development Promotion

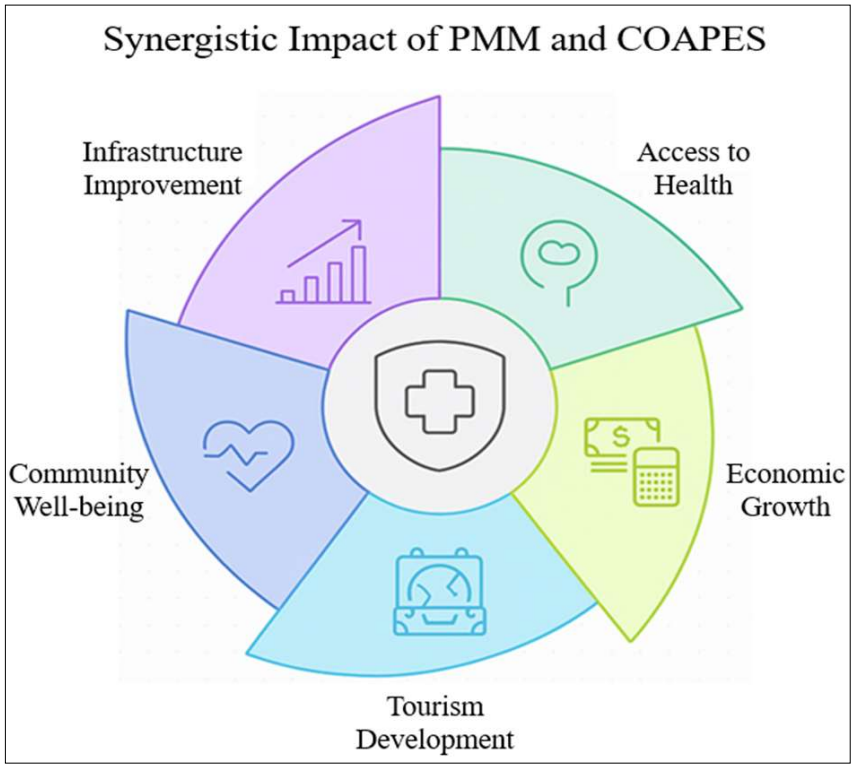


Source: elaborated by the authors, 2025

The organization and operation of this relationship, defining the responsibilities of each involved actor, along with areas of activity and the objectives to be achieved, serve as a guiding framework for the development of collaborative practices between educational institutions and healthcare services. This dynamic connection can be likened to an evolutionary process that has driven the transformation of primary care in Brazil. The arrival of physicians in underserved regions through PMM, often accompanied by the implementation of COAPES, has led to a series of adaptations and innovations within health services. Just as evolution leads species to adapt to new environments, this transformation has encouraged health services to adjust to population needs, enhancing access and improving the quality of care.

The synergy between PMM and COAPES is essential for local development, as it fosters the training of more qualified health professionals and improves the quality of primary care. These instruments contribute to strengthening local health systems, developing health promotion actions, and preventing diseases. Encouraging the presence of physicians within communities, along with the implementation of teaching and research activities, fuels social and economic development in these regions, creating new jobs and bolstering the local economy. The result is a significant impact on infrastructure improvements, expanded healthcare access, community well-being, economic growth, and even tourism development—as illustrated in Figure 3.

Figure 3 – Synergistic Impact of PMM and COAPES



Source: elaborated by the authors, 2025

The development flow, living transformation, and synergies arising from the relationship between PMM and COAPES make it possible to grasp the complexity and significance of this process in promoting local development. The integration of education and health service, along with the training of more qualified professionals, act as catalysts for the transformation of local healthcare systems, contributing to improved quality of life for the population in a synergistic and immersive manner.

Despite the contributions of this study, some limitations must be acknowledged. First, the qualitative nature of the research and the focus on a single case study (Canindé-CE) prevent the statistical generalization of the results to other regions with different socio-economic dynamics. Second, the reliance on institutional documents and secondary literature may present a fragmented view of the local reality, as it does not include primary data from direct interviews with health users or professionals. Future research could benefit from longitudinal studies and mixed-method approaches to quantify the economic impacts of the PMM/COAPES synergy and to incorporate the perspectives of a broader range of local stakeholders.

8 FINAL CONSIDERATIONS

The municipality of Canindé has emerged as a territory of opportunity, attracting residents due to the expansion of public services, job creation, and the strengthening of urban infrastructure. The population growth observed in recent years reflects demographic trends and the effects of effective public policies aimed at promoting local development. This scenario brings new challenges to local governance, requiring strategies that ensure the sustainability of achieved improvements and the social inclusion of the entire population.

The analysis conducted in this study revealed that the coordination between PMM and COAPES constitutes an innovative and effective strategy for strengthening Brazil's Unified Health System (SUS) in vulnerable contexts. The presence of physicians in historically underserved areas, combined with the hands-on training of medical students in real-world care settings, has led to significant advances in service quality, primary care effectiveness, and humanization of care. This integration between education, service, and community has contributed to the training of professionals who are more attuned to local realities and committed to health equity.

Beyond the direct impacts on health, the coordination between PMM and COAPES has generated synergistic effects in local development. The continuous presence of professionals and students stimulates the economy, encourages infrastructure investment, and strengthens sectors such as commerce, tourism, and services. To illustrate this dynamic, the study presented a flowchart of intersectoral impacts, showing how health and education, when integrated, act as catalysts for social transformation. The analogy of DNA, the structure that encodes and sustains life, was used to represent the complex and interdependent web of relationships among public policies, institutions, and communities. Just as DNA carries the fundamental instructions for an organism's functioning, the coordination between PMM and COAPES encodes the essential elements for sustainable territorial development.

While providing relevant insights, this research is bounded by its specific geographical focus and its reliance on qualitative documentary evidence. Consequently, the evidence presented should be understood as reflective of the particularities of Canindé (CE). To expand upon these findings, a future research agenda is encouraged, focusing on: (i) longitudinal assessments to quantify the enduring effects of the PMM/COAPES integration on municipal economic metrics; (ii) comparative studies involving diverse regional contexts and institutional models; and (iii) empirical field investigations to capture the lived experiences of health system users. Such efforts are vital to consolidate the 'DNA of local development' as a theoretical model and to refine the design of integrated public policies.

Ultimately, this study demonstrated comprehensively that the synergy between well-structured public policies can produce lasting transformations in the lives of the most vulnerable populations. The experience of Canindé reinforces the importance of continuous investment in health and education as pillars of local development. To ensure the sustainability of these achievements, political commitment, adequate resource allocation, and the strengthening of intersectoral governance are essential. The consolidation of a more equitable and efficient SUS necessarily depends on valuing strategies such as PMM and COAPES, which integrate care, education, and citizenship into a shared national project.

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Data Availability

The entire dataset supporting the findings of this study has been published in the article itself.