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Inequalities in the work process of Brazilian primary health care teams: a rural-urban analysis based on PMAQ-AB data

Desigualdades en el proceso de trabajo de los equipos de Atención Primaria de Salud en Brasil: un análisis rural-urbano basado en el PMAQ-AB

Messias Lemos [1], Carlos Leonardo Figueiredo Cunha [2], Helder Henrique Costa Pinheiro [3], Maria do Socorro Castelo Branco de Oliveira Bastos [4], Naiza Nayla Bandeira de Sá [5], Átila Augusto Cordeiro Pereira [6], Glenda Roberta Oliveira Naiff Ferreira [7], José Luís Guedes dos Santos [8] y Luciano Garcia Lourenção [9]

Abstract: Objective: To evaluate the work process of Primary Health Care teams in Brazil, based on the rural/urban typology defined by the Brazilian Institute of Geography and Statistics. **Method**: This is a cross-sectional evaluative study with a quantitative and analytical approach, based on secondary data from the third cycle of the National Program for Improving Access and Quality of Primary Care (PMAQ-AB), conducted between 2017 and 2018. A total of 37,350 Primary Health Care (PHC) teams (96.1% of those approved for participation) were analyzed. The study focused on two analytical axes: (1) territorialization and (2) team planning. Data were processed using Multiple Correspondence Analysis (MCA), which enabled the identification of patterns in the organization of work processes based on municipal typology. **Results**: The study revealed important disparities across municipal strata. Adjacent rural municipalities had the lowest percentage of teams with uncovered populations (21.0%), while urban and remote intermediate municipalities showed the highest rates (42.0% and 43.6%, respectively). Regarding planning, 15.1% of teams reported not conducting planning activities, with the lowest proportions found in remote municipalities. The MCA perceptual maps identified three main clusters, showing the concentration of positive organizational attributes in intermediate adjacent municipalities and weaker work processes in remote areas. **Conclusion**: The organization of PHC teams' work processes varies significantly according to the rural/urban classification of municipalities. These findings reinforce the need for territorialized policies and differentiated support strategies to strengthen PHC performance in diverse Brazilian contexts.

Keywords: Primary Health Care; Public Health; Community Health Planning; Health Care Process Assessment; Rural Health Services.

Resumen: Objetivo: Evaluar el proceso de trabajo de los equipos de Atención Primaria de Salud en Brasil, con base en la tipología rural/urbana definida por el Instituto Brasileño de Geografía y Estadística. **Método**: Estudio evaluativo de corte transversal, con enfoque cuantitativo y analítico, basado en datos secundarios del tercer ciclo del Programa Nacional de Mejora del Acceso y de la Calidad de la Atención Básica (PMAQ-AB), realizado entre 2017 y 2018. Se analizaron 37.350 equipos de Atención Primaria de Salud (APS) (96,1% de los equipos aprobados para participar). El estudio se centró en dos ejes analíticos: (1) territorialización y (2) planificación de los equipos. Para el análisis se utilizó la Técnica de Análisis de Correspondencia Múltiple (ACM), que permitió identificar patrones en la organización de los procesos de trabajo según la tipología municipal. **Resultados**: Se identificaron importantes disparidades entre los

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estratos municipales. Los municipios rurales adyacentes presentaron el menor porcentaje de población no cubierta (21,0%), mientras que los municipios urbanos e intermedios remotos concentraron los mayores porcentajes (42,0% y 43,6%, respectivamente). En cuanto a la planificación, el 15,1% de los equipos no realizaban actividades planificadas, con los menores índices observados en municipios remotos. Los mapas perceptuales del ACM permitieron identificar tres grupos principales, con mayor concentración de atributos organizacionales positivos en municipios intermedios adyacentes y mayores fragilidades en áreas remotas. **Conclusión**: La organización del proceso de trabajo de los equipos de APS varía significativamente según la clasificación rural/urbana de los municipios. Los resultados refuerzan la necesidad de políticas territorializadas y estrategias de apoyo diferenciadas para fortalecer el desempeño de la APS en los diversos contextos brasileños.

Palabras clave: Atención Primaria de Salud; Salud Pública; Planificación en Salud Comunitaria; Evaluación de Procesos en Salud; Servicios de Salud Rural.

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1. Introduction

In Brazil, the establishment of the Unified Health System (UHS) determined the universal right of the population to health care services. Organized by levels of complexity, the Primary Health Care (PHC), considered the first level of care, is the preferred gateway for users in the health care system. It is characterized by a set of health actions, in the individual and collective scope, which covers the health promotion and protection, disease prevention, diagnosis, treatment, rehabilitation, harm reduction, health maintenance and palliative care. The PHC aims to develop comprehensive care that impacts people's health status and autonomy and the health determinants and conditions of communities (Cordioli et al., 2019; Giovanella et al., 2020; Julio et al., 2021; Lourenção et al., 2022; Massuda et al., 2023).

The work carried out in Primary Health Care (PHC) in Brazil should be guided by the principles of the National Primary Care Policy (NPCP), which establishes the involvement of all team members in the processes of territorialization, planning, monitoring, and evaluation of actions, with the aim of expanding access to and improving the quality of health care (Brasil, Ministério da Saúde, 2017). Furthermore, the PHC work process should include elements related to service organization and action planning based on a defined territory, in order to enhance team performance and the quality of services delivered (Franco et al., 2023; Lourenção et al., 2022; Silva et al., 2020). Thus, territorialization and planning must be incorporated into the teams' daily work routines.

From a theoretical perspective, the organization of the work process in Primary Health Care (PHC) in Brazil has been historically influenced by models marked by fragmentation and task segmentation, often inspired by Taylorist principles, which emphasize task division, prescriptive protocols, and low interaction among professionals (Shimizu & Carvalho Junior, 2012). However, transformations in the health field, especially those emerging from the Community and Preventive Medicine movement, introduced the centrality of teamwork and person-centered care. These changes reflect a shift from hospital-centered practices toward a model based on shared responsibilities and comprehensive care strategies, particularly in the context of the Family Health Strategy (FHS) (Pereira et al., 2013).

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Volumen 23, número 1, Art. Cient. Julio-diciembre 2025

Conceptual frameworks for evaluating the PHC work process include Starfield's typology of teamwork models (Delegated, Collaborative, and Clinical by Consultancy) which emphasize different levels of integration and role definition among team members (Starfield, 2002). Additionally, the work process is structured around macro and microprocesses, such as territorialization, population risk stratification, care planning, and health monitoring, all of which are critical to delivering quality and responsive services (Mendes, 2015). These processes are shaped by the socioterritorial context and the interprofessional dynamics of the teams, reinforcing the need for context-sensitive evaluation approaches and tools that capture the complexity of work organization in diverse municipal settings (Peduzzi et al., 2016; Fernandes, 2014).

Distinct differences are pointed out in the way Primary Health Care teams organize and conduct the work process, with difficulties in adopting managerial tools to conduct activities in relation to the different realities in which they operate (Endalamaw et al., 2023; Kovacs et al., 2021; Rodrigues et al., 2021).

In the case of Brazil, PHC assume the challenge of organizing and articulating healthcare networks, based on the performance of multidisciplinary teams linked to Basic Health Units. In most Brazilian municipalities these Basic Health Units represent the only health services available to the population, and the financing of the teams and actions is a shared responsibility between municipal, state, and national managers, through monthly transfers of resources according to the total population of the municipality. Each Basic Health Unit has a sanitary responsibility over a population attached to a defined territory, contemplating issues related to the social determinants of the health/disease process, intersectoral action, and the inclusion of representative social participation (Endalamaw et al., 2023; Ferreira-Batista et al., 2022; Kovacs et al., 2021; Brasil, Ministério da Saúde, 2017).

Based on the need to improve the national health system through the expansion of access and quality in PHC and the consequent improvement of the health work process, in 2011, the Ministry of Health instituted the National Program for Improving Access and Quality of Primary Care (PMAQ-AB) that allows evaluating organizational and structural characteristics of the Basic Health Units and provide subsidies for the financing and strengthening of PHC in the country (Brasil, Ministério da Saúde, 2015).

Publications based on the results of the cycles of PMAQ-AB showed that Primary Health Care teams have made progress regarding the organization and improvement of the work process; however, weaknesses are still pointed out regarding coverage, action planning and monitoring indicators (Baratieri et al., 2022; Silva et al., 2021). It is noteworthy that studies using data from the 3rd cycle of PMAQ-AB are still incipient and are based especially on regional and local analyses, without taking into account the different rural and urban contexts of Brazilian municipalities.

Although the Brazilian context presents particular challenges related to regional inequalities and territorial extension, disparities in PHC organization between rural and urban areas are also observed in other countries. International studies have shown that rural populations tend to experience barriers in access, service availability, and continuity of care. In Bhutan, rural residents are 3.4 times

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Volumen 23, número 1, Art. Cient. Julio-diciembre 2025

more likely to use primary health centers than hospitals, reflecting both necessity and limited access to specialized services (Ghimiray et al., 2024). In China, spatial analyses have demonstrated significant disparities in the distribution of rural doctors and medical equipment, particularly in remote areas (Wang et al., 2024). Similar patterns of structural inequality have been observed in Romania, where health workforce shortages and poor infrastructure impact the quality of rural care (Cozma et al., 2022), and in Ethiopia, where urban areas show better performance in PHC quality indicators, especially in terms of patient satisfaction and readiness of facilities (Tessema et al., 2017). These findings reinforce that territorial disparities in PHC organization, as observed in Brazil through the PMAQ-AB, constitute a global public health issue requiring localized strategies and institutional investment to ensure equity in service delivery.

In view of the above, this study aimed to evaluate the work process of Primary Health Care teams in Brazil, based on the rural/urban typology defined by the Brazilian Institute of Geography and Statistics.

2. Methods

2.1 Study design

Cross-sectional evaluative research using secondary data from the third cycle of the PMAQ-AB, coordinated by the Ministry of Health of Brazil, from 2017 to 2018.

2.2 Population and Study Sample

The data came from two sources: 1.) microdata from Module II of the External Evaluation of the III Cycle of PMAQ-AB, obtained from the website of the Ministry of Health (Brasil, Ministério da Saúde, 2019); and 2.) rural/urban classification of the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística [IBGE], 2017), used to identify the region and the typology of the municipalities of each team included in the study.

During the approval period for teams eligible to participate in the PMAQ-AB, Brazil had 41,554 Primary Health Care teams registered in the National Register of Health Establishments (NRHE) (Brasil, Ministério da Saúde, 2022).

Among these, 38,865 Primary Health Care teams for oral health (eAB/SB) and Primary Health Care teams (eAB), adhered to the third cycle of PMAQ-AB, distributed among the five Brazilian geographic regions as follows: Midwest (2,669 teams), Northeast (14,489), North (3,199), Southeast (12,854), and South (5,654).

Accordingly, 93.5 % of Brazilian eABs adhered to the third cycle of the PMAQ-AB. A total of 1,515 teams were excluded from the analysis because they did not complete all stages of the external evaluation process, which was a requirement for data comparability and methodological consistency. Therefore, the sample comprised 37,350 teams (96.10 % of the total number of approved teams and 89.9 % of the teams listed in the NRHE).

ISSN-1659-0201
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Volumen 23, número 1, Art. Cient. Julio-diciembre 2025

2.3 Study variables

The variables (questions) of interest related to the work process of Primary Health Care teams were selected directly from the PMAQ-AB external evaluation database, exported to a Microsoft Excel spreadsheet and organized by group of variables referring to territorialization and team planning.

To avoid possible information bias, only answers accompanied by documents proving that the actions were carried out were considered valid. The description of study variables is presented on the Supplementary Files.

The variable "alo population (people/team)" was stratified based on the NPPC (Portaria no 2.436). The teams were classified based on the number of people per Family Health Strategy (FHS) reported during the evaluative cycle and categorized as follows: less than 2,000 people/FHS; between 2,000 and 3,500 people/FHS; and above 3,500 people/FHS.

Finally, we obtained the database with the typology rural/urban of the municipality. These data was obtained from the Brazilian Institute of Geography and Statistics (IBGE) website in a Microsoft Excel® software file. Regarding the rural-urban typology (Instituto Brasileiro de Geografia e Estatística, 2017), we chose to classify Brazilian municipalities according to the IBGE criteria:

a.) Predominantly urban municipalities:

- municipalities in population units with more than 50,000 inhabitants in a dense occupation area;

- municipalities in population units that have between 25,000 and 50,000 inhabitants in a dense occupation area, with a degree of urbanization higher than 50 %;

- municipalities in population units that have between 10,000 and 25,000 inhabitants in a dense occupation area, with a degree of urbanization higher than 75 %.

b.) Intermediate municipalities:

- municipalities in population units that have between 25,000 and 50,000 inhabitants in a dense occupation area, with a degree of urbanization between 25 % and 50 %;

- municipalities in population units that have between 10,000 and 25,000 inhabitants in a dense occupation area, with a degree of urbanization between 50 % and 75 %;

- municipalities in population units that have between 3,000 and 10,000 inhabitants in a dense occupation area, with a degree of urbanization higher than 75 %.

c.) Predominantly rural municipalities:

- municipalities in population units that have between 25,000 and 50,000 inhabitants in a dense occupation area, with a degree of urbanization of less than 25 %;

ISSN-1659-0201
http://ccp.ucr.ac.cr/revista/

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Volumen 23, número 1, Art. Cient. Julio-diciembre 2025

- municipalities in population units that have between 10,000 and 25,000 inhabitants in a dense occupation area, with a degree of urbanization of less than 50 %;

- municipalities in population units that have between 3,000 and 10,000 inhabitants in a dense occupation area, with a degree of urbanization of less than 75 %.

Furthermore, geographic location distinguishes the municipalities in intermediate and rural, and those adjacent to urban centers from those that are remote. Thus, considering the classifications of the Brazilian Institute of Geography and Statistics and using information about the geographic location of the Family Health teams we stratify the municipalities into:

- Urban: municipality with a resident population of more than 50 thousand inhabitants or with a degree of urbanization of more than 75 %.

- Adjacent intermediate: municipality with a resident population less than or equal to 50,000 inhabitants with a degree of urbanization greater than 75 % and that is located geographically close to an urban municipality.

- Remote intermediate: municipality with a resident population of 50 thousand inhabitants or less, with a degree of urbanization higher than 75 %, and which is geographically distant from an urban municipality.

- Adjacent rural: municipality with a resident population of less than or equal to 50,000 inhabitants with a degree of urbanization of less than 75 % and that is located geographically close to an urban municipality.

- Rural remote: municipality with a resident population of 50,000 inhabitants or less, with a degree of urbanization of less than 75 %, and which is geographically distant from an urban municipality.

2.4 Study variables

All analyses were performed using SPSS Statistics software, version 20.0. Initially, we calculating absolute and relative frequencies for identify the distribution of participating teams by Brazilian geographic regions and municipal typology, presenting an overview of the distribution of variables by municipal strata and at the national level.

To analyze the associations between work process variables and municipal typologies, we applied Multiple Correspondence Analysis (MCA), an exploratory multivariate technique suited for categorical data. MCA allows for the identification of patterns and interactions between response categories in contingency tables through their graphical representation in multidimensional space. In the perceptual maps generated, category groupings were interpreted based on their geometric proximity and shared inertia values across dimensions – the closer the points, the stronger the association between the categories (Agresti, 2013; Giovanella et al., 2021; Infantosi et al., 2014).

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Volumen 23, número 1, Art. Cient. Julio-diciembre 2025

MCA was chosen for its capacity to manage large and complex datasets without requiring assumptions about underlying distributions, making it particularly useful for uncovering structural patterns not easily detected through traditional statistical approaches. The resulting clusters enabled the identification of groups of PHC teams with similar organizational characteristics in their work processes.

Although the PMAQ-AB required documentary evidence to validate the data collected, minimizing measurement bias, potential selection bias may be present, as 3.89% of teams were excluded for not completing all stages of the external evaluation. Nevertheless, the high adherence rate (96.1% of approved teams and 89.9% of teams registered in the NRHE) and the national scope of the data enhance the robustness and generalizability of the findings. Variability in data quality across municipalities should be acknowledged as a limitation.

2.5 Ethical aspects

The consent to participate is not applicable. The data used in this study are available in the public domain.

3. Results

The 37,350 Primary Health Care teams analysed were distributed among 28,897 primary health units in 5,310 Brazilian municipalities. Regarding the distribution of the teams by region, it was observed that 13,836 (37.0 %) teams were in the Northeast, 12,346 (33.1 %) in the Southeast, 2,637 (7.1 %) in the Midwest, 3,058 (8.2 %) in the North, and 5,473 (14.7 %) in the South.

The largest number of participating municipalities was in the adjacent rural type (54.6 %), and the smallest in the remote intermediate type (1.1 %). Regarding the distribution of teams by municipal strata, most were located in urban municipalities (59.3 %), and the lowest percentages of participating teams were in the remote intermediate (0.9 %) and remote rural (2.8 %) strata.

MCA was performed with two groups of variables related to the work process of the teams: territorialization and team planning. In the national context, most of the participating teams used territorial maps (94.0 %), presenting approximate values among the strata, with emphasis on the remote intermediate stratum, which presented a lower percentage than the others (84.7 %), as shows Table 1.

ISSN-1659-0201
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Volumen 23, número 1, Art. Cient. Julio-diciembre 2025

Table 1

Distribution of teams, according to municipal typology and territorialization characteristics, Brazil.

Variable	Adjacent Intermediate		Remote Intermediate		Rural Adjacent		Rural Remote		Urban		Brazil	
	n	%	n	%	n	%	n	%	n	%	n	%
Existence of maps of the territory												
Yes	3341	94.8	254	84.7	8738	93.0	795	90.0	19801	94.0	32929	94.0
No	183	5.2	46	15.3	652	6.9	87	9.9	1170	5.6	2138	6.1
Existence of an uncovered population in the territory												
Yes	1069	28.8	149	43.6	2077	21.0	313	30.0	9214	42.0	12822	34.0
No	2643	71.2	193	56.4	8007	79.0	739	70.0	12946	58.0	24528	66.0
Existence of an community health agent uncovered population in the territory												
Yes	1236	33.4	162	47.5	2534	25.0	338	32.0	10706	49.0	14976	40.0
No	2466	66.6	179	52.5	7517	75.0	713	68.0	11307	51.0	22182	60.0
Availability of information that helps management analyze the health situation of the population in the catchment area												
Yes	3452	93.0	294	86.0	9362	93.0	927	88.0	19926	90.0	33961	91.0
No	260	7.0	48	14.0	722	7.2	125	12.0	2234	10.0	3389	9.1
Consideration of risk and vulnerability criteria to define the target population												
Yes	2828	76.2	224	65.5	7482	74.0	686	65.0	15619	71.0	26839	72.0
No	564	15.2	74	21.6	1615	16.0	220	21.0	4457	20.0	6930	19.0
Don't know	320	8.6	44	12.9	987	9.8	146	14.0	2084	9.4	3581	9.6
Target population (people/team)												
<2000	982	26.5	89	26.0	3589	36.0	435	41.0	2788	13.0	7883	21.0
2000-3500	1934	52.1	156	45.6	5178	51.0	486	46.0	9844	44.0	17598	47.0
>3500	796	21.4	97	28.4	1317	13.0	131	13.0	9528	43.0	11869	32.0

It is evident that there was an uncovered population in the coverage territory in 34.0 % of the evaluated teams. The adjacent rural municipalities showed the lowest percentage of teams with a positive response to this variable (21.0 %). Concurrently, the intermediate remote and urban municipalities showed a higher percentage of teams with uncovered populations in the surroundings of their territories (43.6 % and 42.0 %, respectively), as well as those with the largest population discovered by the community health agent (47.5 % and 49.0 %, respectively). Although 99.5 % of the studied teams had the presence of a community health agent professional.

It was also observed that the consideration of risk and vulnerability criteria for the definition of the number of people under the ambit of the teams was reported in a positive way, especially in adjacent intermediate municipalities (76.2 %) and adjacent rural municipalities (74.0 %). The teams in remote

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Volumen 23, número 1, Art. Cient. Julio-diciembre 2025

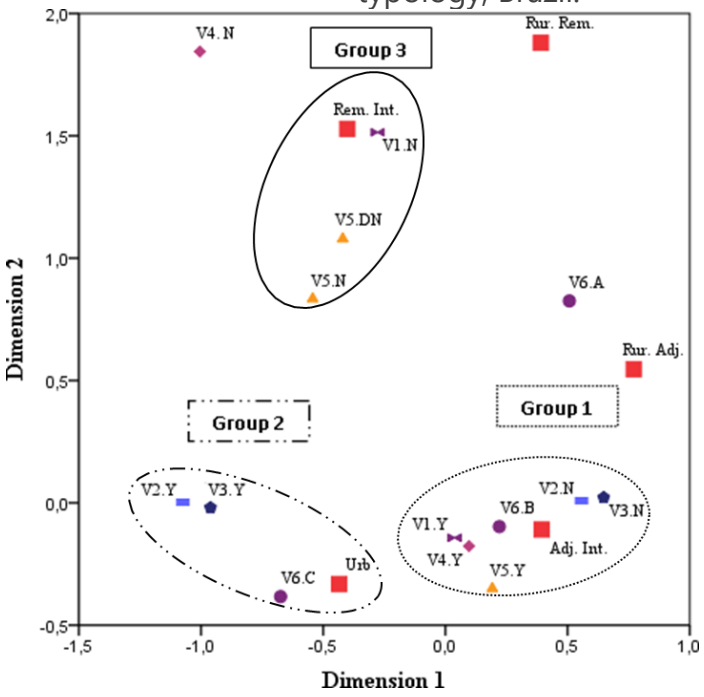
rural municipalities presented the highest percentage of not being aware of the adoption of this measure (14.0 %).

Furthermore, when evaluating the number of people registered under the purview of the teams, the national average was 3,138.45 people per team. The adjacent intermediate municipalities showed a higher percentage of teams with reference population in the range of 2,000 to 3,500 people/team, with urban municipalities remaining conspicuous, with 43.0 % of the teams with reference population above 3,500 people/team.

In the perceptual map resulting from the MCA, the approximate inertias of categories form some clusters, perceiving in the lower right space, where the adjacent intermediate municipal stratum is located, the formation of a cluster of categories considered positive for the territorialization process. In the second set, other categories that express weaknesses in the territorialization process are close to the urban category. Another cluster occurs between the "remote intermediate" category and the categories considered to make it difficult to carry out territorialization (Figure 1).

Figure 1

Association map of variables related to territorialization characteristics according to municipal typology, Brazil.



Adj.Int.: Adjacent Intermediate. Rem.Int.: Remote Intermediate. Rur.Adj.: Rural Adjacent. Rur.Rem.: Rural Remote. Urb.: Urban. Existence of maps of the territory (V1.Y: Yes / V1.N: No); Existence of an uncovered population in the territory (V2.Y: Yes / V2.N: No); Existence of an community health agent uncovered population in the territory (V3.Y: Yes / V3.N: No); Availability of information that helps management analyze the health situation of the population in the catchment area (V4.Y: Yes / V4.N: No); Consideration of risk and vulnerability criteria to define the target population (V5.Y: Yes / V5.N: No / V5.DN: Don't know); Target population (V6.A: <2000 / V6.B: 2000-3500 / V6.C: >3500).

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Volumen 23, número 1, Art. Cient. Julio-diciembre 2025

The categories Rur. Adj., Rur. Rem., V4.N e V6.A had inertias farther away from the groups formed, so they showed no association with other MCA categories.

Using the circles identified in Figure 1, it is possible to visualize the formation of three groups of teams with territorialization characteristics, being: Group 1: Formed mainly by teams located in municipalities of the adjacent intermediate type, which use territory maps, have no community health agent uncovered population, with attached population within the parameter recommended by NPPC, and which receive support from the municipal management for monitoring and population parameterization. **Group 2:** Formed mainly by teams located in urban-type municipalities that have an uncovered population in their territory and that report having an assigned population of more than 3,500 people. **Group 3:** Formed mainly by teams located in remote intermediate type municipalities with low approximation to positive territorialization characteristics.

The results show that 15.1 % of the Primary Health Care teams not plan their actions. The urban stratum presented the highest percentage of Primary Health Care teams that planning their actions (85.7 %). The municipalities located near urban centers (adjacent) showed higher percentages of teams that performed planning, when compared to those with remote characteristics (Table 2).

Table 2

Distribution of teams, according to municipal typology and team planning actions, Brazil.

Variable	Adjacent Intermediate		Remote Intermediate		Rural Adjacent		Rural Remote		Urban		Brazil	
	n	%	n	%	n	%	n	%	n	%	n	%
Performance of planning activities by the team												
Yes	3017	84.3	235	71.9	8272	84.7	751	75.9	18306	85.7	30581	84.9
No	560	15.7	92	28.1	1496	15.3	238	24.1	3060	14.3	5446	15.1
Periodicity												
Weekly	538	15.0	64	19.6	1232	12.6	138	14	6426	30.1	8398	23.3
Biweekly	597	16.7	42	12.8	1591	16.3	135	13.7	3033	14.2	5398	15.0
Monthly	2038	57.0	182	55.7	6016	61.6	587	59.4	8063	37.7	16886	46.9
Bimonthly or greater	404	11.3	39	11.9	929	9.5	129	13.0	3844	18.0	5345	14.8
Conducting monitoring and analysis of health indicators and information												
Yes	3330	89.7	274	80.1	8943	88.7	837	79.6	19459	87.8	32843	87.9
No	382	10.3	68	19.9	1141	11.3	215	20.4	2701	12.2	4507	12.1
Conducting a self-assessment process												
Yes	3354	90.4	271	79.2	8974	89.0	841	79.9	19706	88.9	33146	88.7
No	358	9.6	71	20.8	1110	11.0	211	20.1	2454	11.1	4204	11.3

The frequency of planning meetings involved a predominance of monthly (46.9 %) and weekly (23.3 %) activities. The monitoring and analysis of health indicators and information were performed by a

ISSN-1659-0201
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Doi: https://doi.org/10.15517/b0tt4464
Volumen 23, número 1, Art. Cient. Julio-diciembre 2025

significant portion of the teams (87.9 %), and the values were similar among the municipal strata with similar location characteristics, with lower percentages observed in the strata of remote locations (remote rural (79.6 %) and remote intermediate with 80.1 %).

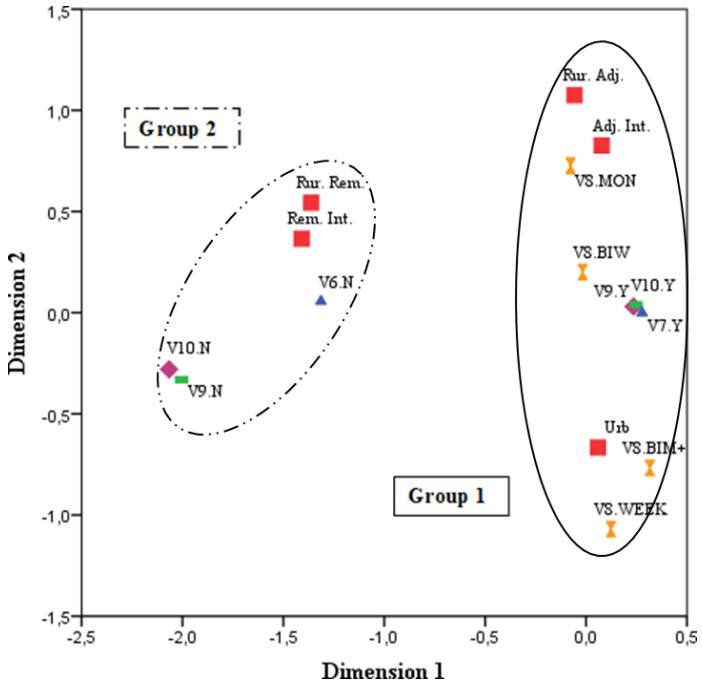
Regarding self-evaluation, 88.7 % of the teams carried out some processes during the year prior to the application of the questionnaire. However, there is a difference between the strata of analysis, with higher percentages of completion by teams from adjacent municipalities (intermediate and rural) with values of 90.4 % and 89.0 %, respectively. Approximate values were observed among municipalities that had the same location characteristics.

As shown in Figure 2, there was the formation of two groups with distinct association patterns when the teams' location categories were observed.

Group 1 is essentially composed of teams located in urban and adjacent municipalities (adjacent rural and adjacent intermediate), which reported executing team planning. Group 2 mainly comprises teams located in the "remote intermediate" and "remote rural" municipal strata, whose orthogonal points are far from the positive response categories, that is, these teams did not perform planning.

Figure 2

Association map of the variables about planning, monitoring, and self-evaluation according to municipal typology, Brazil.



Adj.Int.: Adjacent Intermediate. Rem.Int.: Remote Intermediate. Rur.Adj.: Rural Adjacent. Rur.Rem.: Rural Remote. Urb.: Urban. Carrying out action planning (V7.Y: Yes / V7.N: No); Periodicity of planning meetings (V8.WEEK: Weekly / V8.BIW: Biweekly / V8.MON: Monthly / V8.BIM+: Bimonthly or greater); Conducting monitoring and analysis of health indicators and information (V9.Y: Yes / V9.N: No); Conducting a self-assessment (V10.Y: Yes / V10.N: No).

ISSN-1659-0201
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Volumen 23, número 1, Art. Cient. Julio-diciembre 2025

3.1 Discussion

The MCA results identified different profiles for the work process of the Brazilian Primary Health Care teams, which varied according to the characteristics of the municipalities in which they are located. Three profiles were identified in the analysis of variables related to territorialization and two patterns in the analysis related to team planning. There were differences in the composition of the groups, that have varied according to the municipal typology.

These patterns support theoretical assumptions regarding the centrality of territory in organizing Primary Health Care services, as emphasized in Brazilian health policy and planning literature (Giovanella et al., 2012; Merhy, 2007). The effectiveness of territorialization and planning is influenced not only by the availability of financial and structural resources but also by sociopolitical and organizational dimensions that shape the health work process. According to labor process theories, particularly those focused on healthcare (Merhy et al., 2004), the interaction between structure, professional autonomy, and the dynamic nature of work determines how care is operationalized across different contexts. The MCA findings reinforce these assumptions by demonstrating that teams in adjacent intermediate municipalities, with moderate urbanization and geographic proximity to urban centers, tend to present better integration of planning and territorialization practices, possibly due to stronger institutional support and better access to management tools. Conversely, remote municipalities, where MCA points are farther from positive categories, reveal structural and contextual disadvantages that hinder the incorporation of organizational routines, illustrating the concrete effects of geographic and social isolation on health care delivery.

The main limitation of this study is the process of voluntary adherence of Primary Health Care teams, which may represent a weakness for the representativeness of the data. Therefore, it is necessary to be cautious when extrapolating the findings to other contexts. However, we believe that the results portray the context of the work process of rural/urban Primary Health Care teams in different regions of Brazil.

In recent years, the number of primary healthcare teams in the country has expanded exponentially, especially the FHS (Brasil, Ministério da Saúde, 2022). This process was influenced by the creation of the “Mais Médicos Program” in 2013, responsible for reformulating more than 57.3 % of conventional Primary Health Care teams to family health teams, especially in municipalities with less than 30,000 inhabitants, which directly impacted the substantial increase in population coverage by PHCs (Barros et al., 2022; Giovanella et al., 2021; Hone et al., 2020).

A nationwide study indicated that more than half of the Brazilian population reported being registered in a primary health unity, and that rural areas have a higher prevalence of linkage when compared to urban áreas (Otieno et al., 2020).

In line with the findings of this study, difficulties related to linking/enrolling the population to Primary Health Care teams in urban municipalities may be related to the existence of care gaps in intra-urban

ISSN-1659-0201
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Doi: https://doi.org/10.15517/b0tt4464
Volumen 23, número 1, Art. Cient. Julio-diciembre 2025

areas, in which the distribution and supply of services may be hampered by the social dynamics of these locations (Ferreira et al., 2021).

We highlight the important expansion of low-income housing developments in large urban centers that favors the improvement of however, it may contribute to the worsening of the historical difficulties of PHC coverage in large cities (Lima et al., 2022; Pinto et al., 2022).

The remote intermediate municipalities, even with a smaller number of people linked to the teams, showed a greater association with the non-use of organizational and epidemiological information and tools in carrying out the territorialization. On the other hand, teams located in adjacent intermediate municipalities showed an association with positive territorialization factors.

We understand that adjacent municipalities have medium population size, moderate urbanization rate, and geographical proximity to predominantly urban municipalities, and thus suffer strong influences from them, absorbing characteristics of development and growth.

Municipalities with lower population concentrations are more susceptible to unfavorable factors for health management, owing to local characteristics of access to services, as well as the difficulty in hiring human resources (Ferreira et al., 2023; Franco et al., 2021).

The evaluation of the two groups identified by the MCA for team planning indicates important differences according to the municipal typology. Municipalities of the remote type showed a distance from carrying out team planning, while those located in urban and adjacent municipalities showed a positive association for such aspects of the work process.

Such observations may be related to losses in the organization of the work process, caused by the difficulty in attracting and retaining qualified human resources, especially in municipalities located far from large urban centers (Lourenção et al., 2022; Silva et al., 2020). These losses are expressed in the high turnover of professionals to compose the teams, reflecting the loss of strategic people, disruption in the planning of the work process, and consequent organizational deficiencies (Pinto et al., 2022; Silva et al., 2021).

Other factors may also be related, such as the difficulty faced by the teams to use the information produced and recorded in the information systems in their field of action, in order to assist in planning and reorganizing the work process, the low expansion of continuing education actions in the scope of PHC to the municipalities in the interior, and the fragilities in access to the Internet (Endalamaw et al., 2023; Ferreira et al., 2023).

Results indicate the need to increase the number of Primary Health Care (PHC) teams in Brazil, especially in urban municipalities, where teams already serve a reference population larger than recommended and must also care for an unregistered portion of the population, which compromises their ability to meet local demands. Furthermore, the data suggest the need to strengthen planning in rural and remote municipalities by adopting recommendations tailored to the local reality, since

Doi: https://doi.org/10.15517/b0tt4464
Volumen 23, número 1, Art. Cient. Julio-diciembre 2025

national guidelines do not adequately reflect the incorporation of planning into the teams' work processes.

Based on these findings, it is recommended to develop differentiated policies to strengthen planning and territorialization in rural and remote municipalities. Such policies should include increased investment in infrastructure, incentives to retain qualified professionals, expansion of continuing education programs, and improved digital access to ensure effective use of health information systems in the planning process.

The results highlight the importance of adapting public policies to the territorial specificities of municipalities. Remote and rural areas, in particular, may benefit from strategies such as differentiated funding models, telehealth infrastructure, and incentive programs to attract and retain health professionals. Strengthening territorialization and planning capacity in these contexts is essential to ensure equitable access to primary care services.

Therefore, context-sensitive and differentiated strategies are needed to strengthen the work processes of PHC teams throughout Brazil. In municipalities classified as remote or rural, actions should include strengthening basic infrastructure, ensuring stable connectivity and access to information systems, and expanding financial incentives to attract and retain qualified professionals. Investing in continuing education and territorial management training is also crucial to support effective planning and surveillance practices. Public policies must consider the heterogeneity of local contexts and promote integrated approaches that combine technical, managerial, and community resources to guarantee comprehensive and equitable care delivery. The results reinforce the importance of adjusting support mechanisms not only based on population size or epidemiological risk but also according to the specific challenges faced by each municipal typology.

4. Conclusion

The results of this study suggest that there are significant differences in the work processes of Primary Health Care teams that vary according to the characteristics of the municipalities in which they are located. Teams based in urban or adjacent municipalities showed better performance related to territorialization and team planning. Multiple Correspondence Analysis indicated that urban municipalities, although associated with positive characteristics of the territorialization process, also showed a greater association with populations registered above the number recommended by the Ministry of Health, as well as the presence of residents in the territory who are not linked to a Basic Health Unit.

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