

Structural typology of Primary Health Care Units in the Federal District

Tipologia da estrutura das Unidades Básicas de Saúde do Distrito Federal

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ABSTRACT The structure typology is a composite indicator that includes physical structure, availability of equipment, material and human resources, and information systems. A 43-variable instrument based on the proposed national typology was constructed to develop a typology to evaluate the Primary Health Care Units (PHC Units) in the Federal District (FD), Brazil. Data were collected from the PHC Unit and the FD's information systems from August/2020 to January/2021. In the analysis, the dimensions were weighted and classified into types A, B, C, D, and E (A adequate/E insufficient)—one hundred fifty-seven of the 165 existing PHC Units provided complete data for evaluation. Three PHC Units obtained the maximum Type A classification, representing 1.9% of the total; 53 PHC Units were Type B (33.8%), 52 Type C (33.1%), 30 Type D (19.1%), and 19 Type E (12.1%). Nine PHC Units scored very low in 'available services' with unavailable vaccinations, telehealth, tests, and medicines and had incomplete teams. The result showed that the PHC Units in the FD require structural improvements, which, aligned with the other actions provided for in the Qualis-APS Program, will improve PHC quality in the FD and develop the full potential of the health teams.

KEYWORDS Primary Health Care. Health services research. Service structure.

RESUMO A tipologia da estrutura é um indicador composto que compreende a estrutura física, a disponibilidade de equipamentos, recursos materiais e humanos, além dos sistemas de informação. Com o objetivo de desenvolver uma tipologia para avaliar as Unidades Básicas de Saúde (UBS) do Distrito Federal (DF), construiu-se um instrumento com 43 variáveis, a partir da proposta de tipologia nacional. Entre agosto/2020 e janeiro/2021, coletaram-se dados nas UBS e nos sistemas de informação do DF. Na análise, ponderando as dimensões, gerou-se a classificação nos tipos A, B, C, D e E (A adequada/E insuficiente). Das 165 UBS existentes, 157 forneceram dados completos para avaliação. Três UBS obtiveram classificação Tipo A, máxima, representando 1,9% do total; 53 UBS do Tipo B (33,8%); 52 do Tipo C (33,1%); 30 do Tipo D (19,1%) e 19 do Tipo E (12,1%). Nove UBS apresentaram pontuação muito baixa em 'serviços disponíveis', expondo indisponibilidade de vacinação, teleatendimento, exames, medicamentos e incompletude de equipes. O resultado evidenciou que as UBS do DF necessitam de melhorias estruturais, que, em consonância com as demais ações previstas no Programa Qualis-APS, contribuirá para a melhoria da qualidade da atenção primária no DF e o desenvolvimento do pleno potencial das equipes de saúde.

PALAVRAS-CHAVE Atenção Primária à Saúde. Pesquisa sobre serviços de saúde. Estrutura de serviços.

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Introduction

Primary Health Care (PHC) has been enhanced through several evaluations that analyze its advances and challenges as driving strategies for improving the Unified Health System and the Family Health Strategy (FHS)^{1,2}. To this end, reliable methodologies with scientific scrutiny recognized nationally and internationally are employed to understand the workflow and quality of care provided in PHC³.

However, PHC still faces significant challenges⁴, which leads to the need for structural initiatives, especially in management. In the Federal District (FD), a critical strategy was the creation of the Primary Health Care Qualification Program (Qualis-APS), which was implemented in 2019. This proposal aims to improve the services provided in primary care, including, as one of its axes, implementing an assessment system through innovative methods that employ participatory evaluation to analyze the functioning, organization, and work processes of health teams and the physical structure of Primary Health Care Units (PHC Units)⁵.

When available in a way that facilitates access to the several health services offered, the physical structure can provide continuous assistance that strengthens the principles of universality, comprehensiveness, and equity in health⁶. It can be understood as stable elements of health services, including instruments, inputs, human resources, and the physical and managerial context of health actions⁷.

Employing 2012 national data collected in the National Program for Improving Access and Quality of Primary Care (PMAQ-AB), Giovanella et al.⁸ and Bousquat et al.⁹ developed a classification of PHC Unit per their structure, called 'the Brazilian PHC Unit structure typology.' The FD's PHC Unit typology was developed from this reference, official documents from the Ministry of Health for PHC, and the local context assessed through the diagnosis of the structure of the PHC Unit

in the Federal District (FD)⁵. Its dimensions, variables, and scores were widely discussed and analyzed by team members from the University of Brasilia (UnB), the Qualis-APS Program, and the technical team from the FHS Directorate of the State Health Secretariat of the Federal District (DESF/SES-DF), so that modifications and inclusions could be made, when necessary, to arrive at a classification aligned with the FD's reality. Among the documents guiding the proposed PHC Unit structure typology are Technical Note N° 5, which provides information on the PHC Unit typology⁸; Ordinance N° 77 of February 14, 2017¹⁰, which establishes the PHC Policy of the Federal District; Ordinance N° 489 of May 24, 2018¹¹, which addresses the structuring and operation of the Expanded Family Health and Primary Care Centers (EFHPCC); Ordinance N° 496 of May 25, 2018¹², which addresses the transition process of PHC teams, secondary data from SHS-FD Primary Care Monitoring provided by the DESF/SES-DF, and Qualis-APS Program's primary data obtained from the diagnostic assessment of the FD's PHC Unit structure in 2020 and 2021.

Regarding the PHC Unit structure, we should underscore that the typology comprises elements that transcend the physical structure, including everything from equipment availability to technology and information components. In this sense, this article aims to present a typology proposal for the PHC Unit in the Federal District that allows distinguishing them based on their structural conditions.

Material and methods

Study design and data collection

This descriptive study evaluated the PHC Unit typology in the Federal District developed with the local PHC management team. It was planned to be a census study and applied to all 165 existing PHC Units. Initially, the

Qualis-APS Program provided for on-site data collection. However, the collection strategy was adapted to an online format after the social distancing decree for measures to contain COVID-19 was enacted in March 2020.

The information was collected using two instruments developed especially for this purpose: a telephone interview script and a self-completion questionnaire. A team of 12 duly trained research assistants from UnB of the Qualis-APS applied them from August 2020 to January 2021. The survey respondents were members of Family Health Teams (FHT) and Primary Health Care Service Managers. All responded after reading and signing (virtually) the Informed Consent Form. Some administrative data provided by DESF/SES-DF for October 2020 were also used.

Adapting the structure typology instruments to the FD's PHC Unit

The Brazilian PHC Unit structure typology has five dimensions: team type, staff, available shifts, services, and infrastructure. This last dimension encompasses three sub-dimensions: physical structure and equipment, inputs, and Information and Communication Technology (ICT) equipment. Each dimension is assessed based on variables that add points to it, selected based on some assumptions, namely: 1) relevance for observing the dimension; 2) capacity of discriminating the PHC Units by observing the variable; 3) potential to be a marker of what is intended to be measured.

We underscore the critical contribution of the authors of the guiding study^{8,9}, Giovanella and Bousquat, who participated in a detailed discussion of the parameters and analyses of the Qualis-APS Program through a videoconference meeting held by the UnB researchers.

To adapt the Brazilian PHC Unit structure typology to the reality of the Federal District, we considered that the dimension 'available shifts' should not be included since its reference and variables could not discriminate the PHC Unit of the Federal District because all the PHC Unit

units of the Federal District operate in at least two shifts and five days a week.

Also, we decided that the sub-dimensions 'physical structure and equipment,' 'inputs,' and 'ICT equipment' would be assessed as dimensions, but the 'infrastructure' dimension would give way to its three underlying sub-dimensions. This process occurred during the statistical evaluation stage using Factor Analysis (FA), proposed by the authors of the guiding study. This stage is responsible for determining the weight of each dimension in the instrument; when performed with data relating to the FD's PHC Unit, it resulted in the three subdimensions that made up the 'infrastructure' dimension contributing a low weight to the typology as a whole, which was undesirable.

Based on the guiding study, a collective process was developed to decide which variables would be maintained, excluded, or added. It included the expertise of the research team members and DESF/SES-DF technicians and access to primary data from the research to diagnose the FD's PHC Unit structure. The variables, the input of the guiding research's authors, and access to national and FD regulations indicated the relevance and discrimination capacity of the PHC Unit.

For the final version of the FD's PHC Unit structure typology, 11 of the 25 variables that make up the Brazilian PHC Unit structure typology^{8,9} were maintained, four were adapted, and seven were excluded; 16 new variables were included in the dimension 'team type,' two that were adapted from the Brazilian PHC Unit structure typology were incorporated into them; one variable was included in 'staff,' two in 'available services,' 17 in 'physical structure,' five in 'inputs,' and one in 'ICT equipment.'

At the end of the adaptations, the FD's PHC Unit structure typology comprised six dimensions: team type, staff, available services, physical structure, inputs, and ICT equipment. For each dimension, we established a reference describing the desirable characteristics for the PHC Unit to be classified as excellent.

The evaluation variables for each dimension were listed, and the scoring criteria were established from the references. We defined the scoring criteria by analyzing the relevance of the variable within the dimension and the level of compliance with the elements described in the reference.

Statistical methods used in the typology data analysis

The steps for determining the final score of the structure typology are listed as follows: Determining the score of the typology variables; Scoring the dimensions; Standardizing the score of the typology dimensions; Calculating the weight of each dimension within the structure typology; Calculating the final score of the PHC Unit per the structure typology; Adjusting the final score of the structure typology per the number of FHT in the PHC Unit. A detailed description of each of these steps is shown below.

THREE WAYS OF DETERMINING THE SCORE OF THE TYPOLOGY VARIABLES

a) Direct: For this type of variable, only the maximum score is specified, which is the score that should be assigned when the PHC Unit complies with the variable's description. Otherwise, the score should be zero. Example: Regarding the variable 'vaccination,' offering the vaccination service confers the score described (2 points), and not offering the vaccination should be scored as '0'.

b) Gradual: This type of variable has multiple descriptions and scores, which are gradual, starting at zero and going up to the maximum score for the variable in question. In these cases, only one description corresponding to the reality of the PHC Unit should be chosen and its score considered. Example: The variable 'medication dispensing/delivery' is an example of a gradual variable. According to the reality of the PHC Unit, one of the options should be chosen. Suppose that PHC Unit

X delivers medicines but not psychotropic drugs; in this case, the score for the variable should be '1'.

c) Aggregated: In this type of variable, the multiple descriptions and respective scores must be added together to compose the final score for the variable. Each description of the variable must be evaluated individually, considering whether or not the description is met. At this point, a score of '0' should be given for non-compliance with the variable's description or a separate score for compliance. After the individual assessment of each variable description, the scores must be added together to form the final score for the variable. The structure typology only displays two variables ('suitable location for respiratory symptomatic user' and 'signage'). For example, to score the 'signage' variable, one must first observe whether or not each of the variable descriptions is met, assign the equivalent score, and then add up the individual scores. Therefore, if PHC Unit Y has signage indicating its opening hours (0.25 points) and the staff roster (0.25 points) but does not have a list of services offered (0 points) and PHC Unit contacts (0 points), PHC Unit Y's final score in the 'signage' variable will be 0.5.

SCORING THE DIMENSIONS

Each dimension has one or more types of variables depending on the form of its score and a particular way of calculating the dimension score. Below, we show how to calculate the dimension score based on the determined score of its variables:

Team type: It must be scored by choosing one of the variables described, except for the variable 'street office team', which adds a score. Thus, a PHC Unit can count on all its FHTs with the support of the Oral Health Team (OHT) and EFHPCC, with a mean number of users registered in e-SUS between 50% and 100% of the maximum limit provided for in specific Federal District regulations and, therefore, score 8 points in this dimension.

However, an additional 0.5 points will be added if it also has a street office team, totaling 8.5 points, the maximum dimension value.

Staff: Each variable in this dimension has a gradual score. One of the options available for each variable must be selected per the established criteria, and the scores of the variables must be added together to obtain the final score for the dimension. The maximum score for this dimension is 12 points.

Available services: We have two scoring methods, depending on the variable. For those that score directly, selection is based on the criterion of compliance or non-compliance with the variable. One of the options must be selected for variables with a gradual scoring method. After scoring the variables, they must be added together, and the maximum dimension value is 7.5 points.

Physical structure: Besides the graded and direct scoring variables, we have two variables in which the scoring components must be added together to generate the final score for the variable, configuring the aggregate score. Variables 'suitable location for respiratory symptomatic user' and 'signage' include

more than one component to be analyzed for the variable's score; they can co-occur and, therefore, have their scores added together. For these two variables, the score ranges from 0 to 1 point. They must be added together after each variable in the dimension is scored individually, and the maximum score for the dimension is 20 points.

Inputs: The variables can be of the gradual scoring type, when the score must be established by choosing only one of the options, and direct, in which the completion or not of the variable's description must be observed. At the end, the points must be added up, reaching a maximum limit of 7 points.

ICT Equipment: It has gradual and direct scoring variables. The scores of the variables must be added, and the maximum value of the dimension score is 4 points.

STANDARDIZING THE SCORE OF THE TYPOLOGY DIMENSIONS

The score for each dimension was standardized to a scale of 0-1 using the following formula to compare dimensions:

Figure 1. Equation for determining the final score of the PHC Unit structure typology

$$\text{Weight1 (0,155)} * \text{Score}_{\text{TeamType pad}} + \text{Weight2 (0,179)} * \text{Score}_{\text{Staff pad}} + \text{Weight3 (0,226)} * \text{Score}_{\text{Servicespad}} + \text{Weight4 (0,187)} * \text{Score}_{\text{PhysicalStructure pad}} + \text{Weight5 (0,175)} * \text{Score}_{\text{Inputs pad}} + \text{Weight6 (0,078)} * \text{Score}_{\text{ICT pad}} = \text{PHC Unit Typology}$$

Source: Prepared by the authors.

Table 1 presents the formulas used for each dimension to standardize the 0-1 scale and the weights of each dimension within the structure typology.

CALCULATING THE WEIGHT OF EACH DIMENSION WITHIN THE STRUCTURE TYPOLOGY

A statistical test called Factor Analysis (FA) was adopted to define each dimension's weight

in the typology's final score. For this analysis, we used the scores obtained by the PHC Unit in each dimension, with the score standardized to one on a scale of 0-1. The coefficients of each dimension's factor loadings determined each weight, considering their representativeness in the set of dimensions evaluated.

Table 1. The calculation for standardizing scores and weights of structure typology dimensions of PHC Units of the Federal District, per the factor analysis. Brasília, 2020/2021

| N | Dimension | Calculation | Factor loading | Weight |
|--------------|--------------------|--------------------------------------|----------------|--------------|
| 1 | Team type * | PHC Unit score in the dimension/8 | 0.492 | 0.155 |
| 2 | Staff | PHC Unit score in the dimension /12 | 0.566 | 0.179 |
| 3 | Available services | PHC Unit score in the dimension /7.5 | 0.717 | 0.226 |
| 4 | Physical structure | PHC Unit score in the dimension /20 | 0.592 | 0.187 |
| 5 | Inputs | PHC Unit score in the dimension /7 | 0.553 | 0.175 |
| 6 | ICT Equipment | PHC Unit score in the dimension /4 | 0.247 | 0.078 |
| Total | | | 3.103 | 3.167 |

Source: Prepared by the authors.

* Although the maximum score for the 'team type' dimension is 8.5, due to the possibility of adding 0.5 points for the presence of street office teams, the maximum value of 8.0 points was considered for calculating the standardization of the dimensions. This fact occurred due to the understanding that not all PHC Units have the profile for the availability of such teams and that, therefore, the point should be, in fact, additional without harming the other PHC Units without street office teams. For this reason, the 'team type' dimension can reach a standardized score of up to 1.0625 points, which differs from the other dimensions that have a maximum score equal to 1.

CALCULATING THE FINAL SCORE OF THE PHC UNIT PER THE STRUCTURE TYPOLOGY

This calculation aims to adjust the dimension scores according to the weight calculated for each and add up the points of the adjusted dimensions. This calculation's result presents a score ranging from 0 to 1, where 0 is the minimum score, and 1 is the maximum score that represents compliance with all the variables described.

ADJUSTING THE FINAL SCORE OF THE STRUCTURE TYPOLOGY PER THE NUMBER OF FHTS IN THE PHC UNIT

After the final score of the PHC Unit was determined, an adjustment was made per the number of FHTs present in the PHC Unit. Thus, the PHC Units with up to 4 FHTs kept their final score unchanged; PHC Units with 5 to 7 FHTs had their final score reduced by 5%; and PHC Units with more than seven FHTs had their final score reduced by 10%. This adjustment ensured that large PHC Units with a wide range of service offerings, which

generated a better score according to the structure typology, did not achieve a classification that did not represent reality.

This concern arises because, although the provision of services is essential as a component of the PHC Unit structure – when the spaces that allow this provision, such as vaccination and test collection rooms, for example, are divided among many teams – the quality of the provision of services may be reduced. Furthermore, the National Primary Care Policy (PNAB)¹³ recommends that PHC Units have up to four FHTs each, and the guidelines of the PHC Coordination of the Federal District direct the construction of PHC Units with up to seven FHTs each, justifying the score reduction of PHC Unit with a higher number of FHT.

The definitive version of the PHC Unit structure typology of the Federal District

After the adjustments, the typology values are shown in *box 1*, which describes the structure typology's dimensions, references, variables, and scores.

Box 1. List of dimensions, their references, variables, and structure typology scoring criteria of PHC Units in the Federal District. Brasília, 2020/2021

| References | Variables | Points | Criteria | Score type | Maximum score |
|---|---|--------|---|------------|---------------|
| Dimension: Team type | | | | | |
| <p>PHCU with all Family Health Teams (FHT) with support from Oral Health Teams (OHT) and EFHPCC, with a mean number of users registered in the e-SUS between 50% and 100% of the maximum limit provided for in specific DF regulations^a</p> <p>Note: a - Secretaria de Estado de Saúde (DF). Portaria nº 77, de 14 de fevereiro de 2017. Estabelece a Política de Atenção Primária à Saúde do Distrito Federal [Internet]. Diário Oficial do Distrito Federal, Brasília, DF. 2017 fev 15 [acesso em 2023 jul 10]; Edição 33; Seção 1:4. Disponível em: https://www.sinj.df.gov.br/sinj/Norma/b41d856d8d554d4b95431cdd9ee00521/ses_prt_77_2017.html</p> | 100% of the FHT with support from the OHT and EFHPCC, with a mean number of users registered in the e-SUS between 50 and 100% of the maximum limit provided for in specific DF regulations | 8.0 | Mean of 2,000 to 4,000 registered users per FHT. Considering that each OHT supports up to 2 FHT | Direct | 8.5 |
| | ≥ 75% of the FHT with support from the OHT and EFHPCC, with a mean number of users registered in the e-SUS between 50 and 100% of the maximum limit provided for in specific DF regulations | 7.0 | | | |
| | ≥ 50% of the FHT with support from the OHT and EFHPCC, with a mean number of users registered in the e-SUS between 50 and 100% of the maximum limit provided for in specific DF regulations | 6.0 | | | |
| | < 50% of the FHT with support from the OHT and EFHPCC, with a mean number of users registered in the e-SUS between 50 and 100% of the maximum limit provided for in specific DF regulations | 4.0 | | | |
| | 100% of the FHT with support from the OHT or the EFHPCC and with a mean number of users registered in the e-SUS between the limit of 50 and 100% provided for in specific DF regulations | 6.0 | | | |
| | ≥ 75% of the FHT with support from the OHT or the EFHPCC and with a mean number of users registered in the e-SUS between the limit of 50 and 100% provided for in specific DF regulations | 5.0 | | | |
| | ≥ 50% of the FHT with support from the OHT or the EFHPCC and with a mean number of users registered in the e-SUS between the limit of 50 and 100% provided for in specific DF regulations | 4.0 | | | |
| | < 50% of the FHT with support from the OHT or the EFHPCC and with a mean number of users registered in the e-SUS between the limit of 50 and 100% provided for in specific DF regulations | 3.0 | | | |
| | 100% of the FHT with support from the OHT and the EFHPCC, with a mean number of users registered in e-SUS outside the maximum limit provided for in specific DF regulations | 6.0 | | | |
| | ≥ 75% of the FHT with support from the OHT and the EFHPCC, with a mean number of users registered in the e-SUS outside the maximum limit provided for in specific DF regulations | 5.0 | | | |
| | ≥ 50% of the FHT with support from the OHT and the EFHPCC, with a mean number of users registered in the e-SUS outside the maximum limit provided for in specific DF regulations | 4.0 | | | |
| | < 50% of the FHT with support from the OHT and the EFHPCC, with a mean number of users registered in the e-SUS outside the maximum limit provided for in specific DF regulations | 2.0 | | | |

Box 1. List of dimensions, their references, variables, and structure typology scoring criteria of PHC Units in the Federal District. Brasília, 2020/2021

| References | Variables | Points | Criteria | Score type | Maximum score |
|---|--|--|---|------------|---------------|
| | All FHT without OHT and EFHPCC support, with a mean number of users registered in the e-SUS between the limit of 50 and 100% provided for in specific DF regulations | 2.0 | | | |
| | All FHT without OHT support and with EFHPCC support, with a mean number of users registered in the e-SUS outside the maximum limit provided for in specific DF regulations | 2.0 | | | |
| | All FHTs with OHT or EFHPCC support, with a mean number of users registered in the e-SUS outside the maximum limit provided for in specific DF regulations | 2.0 | | | |
| | All FHT without OHT and EFHPCC support, with a mean number of users registered in the e-SUS outside the maximum limit provided for in specific DF regulations | 1.0 | | | |
| | PHCU with a Street Office Team | 0.5 | Additional point | | |
| Dimension: Staff | | | | | |
| Number of workers in each category per FHT, OHT, and EFHPCC, per DF regulations ^{a,b} Note: b - Secretaria de Estado de Saúde (DF). Portaria nº 489, de 24 de maio de 2018. Regulamenta a estruturação e operacionalização dos Núcleos Ampliados de Saúde da Família e Atenção Básica (Nasf-AB), no âmbito da Atenção Primária à Saúde do Distrito Federal, estabelecendo as normas e diretrizes para a organização de seu processo de trabalho [Internet]. Diário Oficial do Distrito Federal, Brasília, DF. 2018 maio 28 [acesso em 2023 jul 10]; Seção I:3. Disponível em: https://www.sinj.df.gov.br/sinj/Norma/fa973d02ac7f47ad87eb39f3d4fc85b1/Portaria_489_24_05_2018.htm | Doctor | 2.0 | 100% of the FHT with 1 doctor 40h (or equivalent) | Gradual | 12 |
| | | 1.5 | ≥ 50% and < 100% of the FHT with 1 doctor 40h (or equivalent) | | |
| | | 1.0 | < 50% of the FHT with 1 doctor 40h (or equivalent) | | |
| | | 0.0 | Without a doctor in the PHCU | | |
| | | Nurse | | | |
| | 2.0 | 100% of the FHT with 1 nurse 40h (or equivalent) | | | |
| | 1.5 | ≥ 50% and < 100% of the FHT with 1 nurse 40h (or equivalent) | | | |
| | 1.0 | < 50% of the FHT with 1 nurse 40h (or equivalent) | | | |
| | 0.0 | Without a nurse in the PHCU | | | |
| | Dentist | | | | |
| | 1.0 | 100% of the OHT with 1 dentist 40h (or equivalent) | | | |
| | 0.75 | ≥ 50% and < 100% of the OHT with 1 dentist 40h (or equivalent) | | | |
| | 0.5 | < 50% of the OHT with 1 dentist 40h (or equivalent) | | | |
| 0.0 | Without a dentist in the PHCU | | | | |
| Nursing technician or assistant | | | | | |
| 2.0 | 100% of the FHT with 2 nursing technicians 40h (or equivalent) | | | | |
| 1.5 | ≥ 50% and < 100% of the FHT with 2 nursing technicians 40h (or equivalent) | | | | |
| 1.0 | < 50% of the FHT with 2 nursing technicians 40h (or equivalent) | | | | |

Box 1. List of dimensions, their references, variables, and structure typology scoring criteria of PHC Units in the Federal District. Brasília, 2020/2021

| References | Variables | Points | Criteria | Score type | Maximum score |
|--------------------------------------|-------------------------------------|--------|--|------------|---------------|
| | | 0.0 | Without Nursing technicians in the PHCU | | |
| | Oral health technician or assistant | 1.0 | 100% of the OHT with 1 oral health technician 40h (or equivalent) | | |
| | | 0.75 | ≥ 50% and < 100% of the OHT with 1 oral health technician 40h (or equivalent) | | |
| | | 0.5 | < 50% of the OHT with 1 oral health technician 40h (or equivalent) | | |
| | | 0.0 | Without an oral health technician in the PHCU | | |
| | ACS | 2.0 | 6 or + ACS per FHT | | |
| | | 1.75 | 5 to < 6 ACS per FHT | | |
| | | 1.5 | 4 to < 5 ACS per FHT | | |
| | | 1.0 | 3 to < 4 ACS per FHT | | |
| | | 0.75 | 2 to < 3 ACS per FHT | | |
| | | 0.5 | 1 to < 2 ACS per FHT | | |
| | | 0.25 | > 0 and < 1 ACS per FHT | | |
| | | 0.0 | Without ACS in the PHCU | | |
| | Reference EFHPCC team | 2.0 | Complete EFHPCC team (5 professional categories and total of the professionals' weekly workload = 200 hours) | | |
| | | 1.0 | EFHPCC team with a total professionals' weekly workload > 200 hours and at least 5 professional categories | | |
| | | 0.5 | Transitional EFHPCC (3 professional categories and total weekly workload ≥ 120 and < 200) | | |
| | | 0.0 | Without EFHPCC in the PHCU | | |
| Dimension: Available services | | | | | |
| Offers the four services | Medication dispensing/delivery | 3.0 | Medication delivery/dispensing, including psychotropics | Gradual | 7.5 |
| | | 1.0 | Medication delivery/dispensing without psychotropics | | |
| | | 0.0 | Without medication delivery/dispensing | | |
| | Telehealth | 0.5 | Offers the service | Direct | |
| | Vaccination | 2.0 | Offers the service | | |
| | Coleta laboratorial | 2.0 | Offers the service | | |

Box 1. List of dimensions, their references, variables, and structure typology scoring criteria of PHC Units in the Federal District. Brasília, 2020/2021

| References | Variables | Points | Criteria | Score type | Maximum score |
|---|---|--|---|------------|---------------|
| Dimension: Physical Structure | | | | | |
| PHC Unit has adequate facilities and signage, equipment availability, and maintenance | Property Status: owned, leased, or loaned | 1.0 | As per the variable's description | Direct | 20 |
| | Structure for contaminated waste | 1.0 | Available | | |
| | Children's scale | 0.5 | Available | | |
| | Adult's scale | 0.5 | Available | | |
| | Children's anthropometric ruler | 0.5 | Available | | |
| | Adult's anthropometric ruler | 0.5 | Available | | |
| | Sphygmomanometer | 1.0 | Manual or digital adult sphygmomanometer available | | |
| | Reception room | 1.0 | Available | | |
| | Dressing room | 1.0 | Available | | |
| | Medication room | 1.0 | Available | | |
| | Vaccination room | 1.0 | Available | | |
| | Metered dose inhaler | 1.0 | Spacer for pressurized metered dose inhaler available | | |
| | Glucometer | 1.0 | Capillary blood glucose test strips are available | | |
| FHT team per PHCU | 3.0 | Up to 4 FHT in the PHCU | | | |
| | 2.0 | 5-7 FHT in the PHCU | | | |
| | 0.0 | > 7 FHT in the PHCU | | | |
| Office per FHT | 2.0 | 1.5 or more offices per team | | | |
| | 1.0 | < 1.5 and ≥ 1 office per team | | | |
| | 0.0 | < 1 office per team | | | |
| Dental chair maintenance | 1.0 | All dental chairs working, or if there has been any maintenance in the last 3 months | | | |
| | 0.0 | Idle dental chair and chair that has not been maintained in the last 3 months | | | |
| Farmácia | 1.0 | Pharmacy available | | | |
| | 0.5 | Dispensary without a pharmacist present at the PHCU | | | |
| | 0.0 | Without medication delivery/dispensing | | | |
| Suitable location for Respiratory Symptomatic User (RSU) | 0.5 | PHCU with the available exclusive office for RSU | Aggregated | | |
| | 0.5 | PHCU with available Internal or external RSU service waiting location | | | |
| Signage | 0.25 | Signage of PHCU opening hours | | | |
| | 0.25 | Signage of the listing of services offered | | | |
| | 0.25 | Signage of the PHCU staff roster | | | |

Box 1. List of dimensions, their references, variables, and structure typology scoring criteria of PHC Units in the Federal District. Brasília, 2020/2021

| References | Variables | Points | Criteria | Score type | Maximum score |
|--|---|-------------------------|--|------------|---------------|
| | | 0.25 | Signage of PHCU contacts | | |
| Dimension: Inputs | | | | | |
| Permanent availability of basic inputs and no difficulty in supplying or monitoring PPE or medicines | MMR + varicella/pentavalent vaccine | 2.0 | Always available: MMR + varicella + pentavalent vaccines | Gradual | 7 |
| | | 1.0 | Always available: MMR + varicella vaccines | | |
| | | 0.5 | At least 1 of the vaccines available | | |
| | | 0.0 | None of the vaccines available | | |
| Emergency cart | | 1.0 | Fully-equipped emergency cart | | |
| | | 0.5 | Incomplete emergency cart | | |
| | | 0.0 | Without emergency cart | | |
| | O2 (fixed or for transport) | 1.0 | Always available | Direct | |
| | Soap or liquid soap | 1.0 | Always available | | |
| | Supply and monitoring of strategic medicine stock | 1.0 | No difficulty | | |
| Dimensão: Equipamentos de Tecnologia da Informação (TIC) | | | | | |
| Availability of computer with internet access Telephone with active line always available | Computer | 1.5 | Sufficient for the teams | Gradual | 4 |
| | | 0.75 | Insufficient for the teams | | |
| | | 0.0 | Without computer | | |
| | Internet access | 1.5 | Satisfactory Internet | | |
| 0.75 | | Unsatisfactory Internet | | | |
| | | 0.0 | Without Internet | | |
| | | 1.0 | Available | | |

Source: Prepared by the authors.

Ethical aspects

The Human Research Ethics Committee of the Faculty of Health Sciences of the University of Brasília (CEP/FS/UnB) approved this study in March 2020 under Opinion N° 3.937.242 and CAAE N° 29640120.6.0000.0030.

Conceptual classification of the PHC Unit structure typology in the FD

Based on the final scores of the PHC Unit, categories were created according to the

percentage of achievement in meeting the established structural quality criteria. For this division, we adopted the quintile calculation, which indicated an upper range above the score of 0.8 (or 80%) and a mean range of 0.1 (or 10%) among the other four ranges.

Thus, the PHC Unit could be classified under types A, B, C, D, or E, and type A PHC Unit had the best structure, and type E had more significant structural weaknesses. The classification per the PHC Unit final score occurred as follows: PHC Unit Type A: ≥ 0.80 to 1.00; PHC Unit Type B: ≥ 0.70 and < 0.80 ;

PHC Unit Type C: ≥ 0.60 and < 0.70 ; PHC Unit Type D: ≥ 0.50 and < 0.60 and PHC Unit Type E: < 0.50 . After determining their score, the scores were rounded to two decimal places to generate the PHC Unit final classification in the established types. Based on the final score, the description of the PHC Unit, per their classification, occurred as follows:

Type A PHC Unit: Meets 80% or more of the structure quality criteria, and its conditions are close to or ideal for the operation and provision of quality PHC actions and services.

Type B PHC Unit: Meets 70% to less than 80% of the structure quality criteria, with good functioning, but still requires investment to improve its facilities or increase the available inputs to reach the reference.

Type C PHC Unit: Meets 60% to less than 70% of the structure quality criteria, with minimum structure or reduced actions offered to provide services to the population.

Type D PHC Unit: Meets 50% to less than 60% of the structural quality criteria with insufficient structural conditions. Significant interventions are required to correspond to a PHC with the minimum structure for operation.

Type E PHC Unit: Meets 50% or less of the structure quality criteria, evidencing severe structural flaws that adversely affect the FHT's ability to act.

After determining its score, rounding was made to two decimal places to generate the final classification of the PHC Unit in the established types.

Results and discussion

One hundred fifty-seven of the 165 PHC Units included in the diagnosis of the structure of the PHC Unit in the Federal District had the data necessary for their classification. The sample losses occurred because six PHC Units did not complete their participation within the deadline established for the structure diagnosis and because two PHC Units were closed in the

time interval between the completion of the structure diagnosis survey and the evaluation through the structure typology.

Each of the 157 PHC Units in the FD included in the evaluation was classified under the FD's structure typology into Types A, B, C, D, or E. This classification assessed the FHT quality standards (action conducted within the Qualis-APS Program) to prepare action plans to improve PHC quality, which make up the Qualis-APS Program.

Three PHC Units evaluated for the typology achieved the maximum classification (Type A), representing 1.9% of the total. The PHC Units classified as Type B represented 33.8% of the total (n=53); those of Type C, 33.1% (n=52); those of Type D, 19.1% (n=30); and those of Type E, 12.1% (n=19). *Table 2* shows the classification of the FD's PHC Unit under the structure typology, the final scores of the PHC Unit, and the standardized scores by dimensions.

In *table 3*, we can observe, from the means and Standard Deviation (SD) of the dimensions distributed among the PHC Unit types, that the highest scores of the PHC Unit were found in the 'physical structure' dimension, whose mean was 0.78 ± 0.09 , followed by the 'ICT equipment' dimension, which had a mean score of 0.70 ± 0.21 . In the set of all PHC Units evaluated, the dimension with the lowest scores was 'team type,' whose mean score was 0.58 ± 0.29 , followed by the dimension 'services available,' which obtained a mean of 0.61 ± 0.32 .

The results obtained showed that the dimensions of 'available services' and the Units' infrastructure (composed of the dimensions of physical structure, inputs, and ICT equipment) were decisive for the final classification of the PHC Unit, as they were directly related to the score obtained in each of these dimensions. The service portfolio is essential for the organization of care offered by the PHC, as it supports the planning of infrastructure, inputs, equipment, and professional staff so that services can be provided to the population¹⁵. Thus, a PHC Unit with a more significant service offering is likely to obtain a better

classification in its typology, which occurred in the present study.

The PHC Unit infrastructure is essential for the quality of care provided to the population. The inadequate physical space or insufficient resources to conduct the service portfolio entails a direct loss in the quality of care and, possibly, dissatisfaction of health professionals and the population with the services provided. Due to the scope of care recommended by

the FHS, the PHC Unit must have minimum conditions to serve the individual, the family, and the community¹⁶. The PHC Units with the lowest infrastructure score were those classified under types D and E. Thus, it is necessary to balance the service portfolio and the PHC Unit infrastructure, as these two dimensions are interdependent and decisive for the FD's PHC Unit typology.

Table 2. Distribution of the types of the 157 PHC Units evaluated by the Health Region of the Federal District. Brasília, 2020/2021

| AR / Type | | A | B | C | D | E | Total |
|------------------|---|-------|--------|--------|--------|--------|----------------|
| Central | n | 1 | 5 | 3 | | | 9 |
| | % | 0.64% | 3.18% | 1.91% | 0.00% | 0.00% | 5.73% |
| Center-South | n | | 7 | 4 | 3 | 4 | 18 |
| | % | 0.00% | 4.46% | 2.55% | 1.91% | 2.55% | 11.46% |
| East | n | | 5 | 9 | 8 | 2 | 24 |
| | % | 0.00% | 3.18% | 5.73% | 54.10% | 1.27% | 15.29% |
| North | n | | 13 | 12 | 9 | 1 | 35 |
| | % | 0.00% | 8.28% | 7.64% | 5.73% | 0.64% | 22.29% |
| West | n | | 7 | 10 | 8 | 2 | 27 |
| | % | 0.00% | 4.46% | 6.37% | 5.10% | 1.27% | 17.20% |
| Southwest | n | 2 | 9 | 6 | 1 | 8 | 26 |
| | % | 1.27% | 5.73% | 3.82% | 0.64% | 5.10% | 16.56% |
| South | n | | 7 | 8 | 1 | 2 | 18 |
| | % | 0.00% | 4.46% | 5.10% | 0.64% | 1.27% | 11.46% |
| Federal District | n | 3 | 53 | 5ao2 | 30 | 19 | 157 |
| | % | 1.91% | 33.75% | 33.12% | 19.11% | 12.10% | 100.00% |

Source: Prepared by the authors.

n = Absolute frequency; % = Relative frequency.

Table 3. Mean (x) and standard deviation (s) of the scores of the PHC Units by dimension, per the structure typology classification. Brasília, 2020/2021

| Classification | | Type A | Type B | Type C | Type D | Type E | Total |
|----------------------------------|---|--------|--------|--------|--------|--------|-------------|
| N | | 3 | 53 | 52 | 30 | 19 | 157 |
| Team Type | x | 0.92 | 0.74 | 0.58 | 0.39 | 0.39 | 0.58 |
| | s | 0.14 | 0.17 | 0.30 | 0.28 | 0.23 | 0.29 |
| Staff | x | 0.72 | 0.73 | 0.64 | 0.59 | 0.55 | 0.65 |
| | s | 0.06 | 0.06 | 0.15 | 0.08 | 0.12 | 0.13 |
| Available services | x | 0.98 | 0.86 | 0.62 | 0.45 | 0.10 | 0.61 |
| | s | 0.04 | 0.16 | 0.26 | 0.21 | 0.14 | 0.32 |
| Physical structure | x | 0.85 | 0.82 | 0.79 | 0.75 | 0.69 | 0.78 |
| | s | 0.07 | 0.08 | 0.08 | 0.07 | 0.11 | 0.09 |
| Inputs | x | 0.83 | 0.72 | 0.63 | 0.55 | 0.47 | 0.63 |
| | s | 0.11 | 0.13 | 0.18 | 0.17 | 0.19 | 0.18 |
| Information Technology Equipment | x | 0.69 | 0.73 | 0.73 | 0.70 | 0.54 | 0.70 |
| | s | 0.11 | 0.19 | 0.20 | 0.17 | 0.28 | 0.21 |

Source: Prepared by the authors.

When observing the scores in the dimensions by PHC Unit type, regarding the Type A PHC Unit, the dimension ‘available services’ had the highest mean scores (0.98), and ‘staff’ and ‘ICT equipment’ were those with the lowest mean scores (0.72 and 0.69, respectively). Type B PHC Unit and Type A had the ‘available services’ dimension with the highest mean score (0.86); the ‘inputs’ dimension had the lowest mean score (0.72). Type C PHC Unit had mean scores closest to the general average, with the highest scores in the dimensions ‘physical structure’ (0.79) and ‘ICT equipment’ (0.73) and the lowest in the dimensions ‘team type’ (0.58) and ‘available services’ (0.62). Type D PHC Unit ‘team type’ dimension was the most critical by mean score (0.39); ‘available services’ and ‘inputs’ should also be considered priorities as they achieved a mean score of 0.55 or less. Type E PHC Unit showed low mean scores in all dimensions except ‘physical structure’ (0.69), which, compared to the other classifications, had the lowest score in this dimension, emphasizing ‘available services,’ which had the lowest mean score (0.10).

The main characteristics determining Type A PHC Units were their excellent service availability. They offered vaccinations, collection of laboratory tests, and medication delivery/dispensing, including psychotropics, and 66.7% provided telehealth services. All FHTs received support from EFHPCC and eSB, and user registration was as per the normative recommendations in 66.7% of the PHC Unit. They had an excellent physical structure with all their buildings; the proportion of offices per FHT was adequate, and they had a structure for contaminated waste, maintenance of dental chairs, a pharmacy, reception rooms, dressing rooms, and medication rooms. The supply of inputs is excellent despite the difficulty in 33.3% of the PHC Units in supplying medicines. Despite having, on average, a good team of professionals, 66.7% of the PHC Unit did not have at least one doctor working 40 weekly hours per FHT, and none had at least four Community Health Workers (CHWs) per FHT. On average, only 33.3% of the eSB had one full-time Dental Surgeon and one Oral Health Technician. A complete EFHPCC team was identified in only 33.3% of the PHC Unit.

In the Type D PHC Unit, while displaying good physical structure, with more than 90% of PHC Units having reception, dressing, and medication rooms, the property was rented in 40% of cases. Half of the Units had a pharmacy, and the vaccination room was found in only 20% of them; adequate signage was identified in only 6.7% of PHC Units. The availability of ICT equipment is good; 83.3% of the PHC Unit had satisfactory internet, 60% had computers for the teams, and only 26.7% had a landline telephone. The number of professionals was fair, primarily due to the lack of PHC Units with the support of the EFHPCC team for all their FHT at data collection; only 26.7% of the PHC Units had all their eSB with 1 Dental Surgeon working 40 hours per week or equivalent, and 33.3% had one Oral Health Technician. However, all the FHTs had a nurse; 73.3% of USBs had two nursing technicians in all the FHTs; 60% had a doctor working 40 weekly hours or equivalent; and 16.7% had, on average, four CHWs or more.

Regarding the services offered, 83.3% of the PHC Unit offered vaccination, 56.7% offered telehealth services, and 33.3% test collection, while none offered medication delivery/dispensing, including psychotropics, which can be considered poor performance for the 'available services' dimension. The availability of multidisciplinary teams and the adequacy of user registration are poor: only 40% of PHC Unit had full coverage of FHT by eSB, 36.7% by EFHPCC, and the registration of an adequate number of users per FHT occurred in 36.7% of the PHC Unit.

The main points that characterize PHC Unit Type E include its reasonable physical structure and the fact that none of the PHC Units have a pharmacy. The team was reasonable but needed more support from EFHPCC and eSB availability. As for FHT, 84.2% of PHC Units had a nurse in all FHT, 68.4% had two nursing technicians, and 63.2% had one doctor working, on average, 40 weekly hours. No PHC Unit had four or more CHWs per FHT. Only 31.6% and 26.3%

had all their FHTs supported by eSB and EFHPCC, which, on average, indicated poor performance for the 'team type' dimension. The provision of services was also considered very poor due to the low percentages of PHC Units with telehealth services (36.8%) and vaccination (15.8%) and the lack of PHC Units with collection of laboratory tests or medication delivery/dispensing.

After applying the typology criteria, only 3 PHC Units were classified as Type A (1.9%), and about a third of them were classified as Types D or E (31.2%), which points to a wide range of actions that need to be conducted to improve the structural conditions of the PHC Unit in the FD. The 'services available' dimension significantly classified PHC Units into Types A and B since it had the best mean score for these PHC Units. Despite receiving the best mean scores for all PHC Units in the Federal District, the 'physical structure' dimension shows relatively simple gaps to resolve, such as adequate signage to guide users, found in only 12.1% of PHC Units.

The reference standard for the 'team type' dimension was considered to be the availability of FHT with an eSB and an EFHPCC team supporting them in the PHC Unit, besides a registered population between 2,500 and 4,000 users, following local regulations (Ordinance N° 77/2017¹⁰). From 1998 to 2016, the EFHPCC teams financed by the Ministry of Health covered 64.2% of the Brazilian population¹⁷; however, with the new financing rules proposed in 2019¹⁸, we observed a loss in the continuity of PHC multidisciplinary and interdisciplinary work¹⁹ when these teams stopped receiving federal funding.

In the Federal District, in compliance with Ordinance N° 489/2018¹¹, EFHPCC teams were maintained even after federal defunding. However, a study conducted in 2021 indicated that only 36.4% of the territory had EFHPCC coverage²⁰. These data were reflected in the results found for the structure typology due to the PHC Unit's low mean scores for the 'team type' dimension. The population coverage by

teams working in this model increased from 28% to 69% in two years²¹ with the conversion of the FD primary care model to the FHS in 2017 (Ordinance N° 77¹⁰).

One point that requires attention is the FHT undersizing due to the lower number of workers or the lack of some of them. This situation generates an accumulation of activities for team members, which can affect the quality of services²². Therefore, the FHT should be fully staffed by qualified workers dedicated exclusively to the FHS². From 2021 to 2022, we identified an increase of over 12% in doctors' and nurses' appointments in the FD's PHC²³.

While there has been an increase in PHC coverage in the Federal District since Ordinance N° 77¹⁰, the low coverage of CHW often means that users do not perceive these improvements. In the 'staff' dimension, regardless of the classification received in the PHC Unit typology, we observed a demand for investment in human resources in several PHC careers, especially CHW, a professional with a crucial role in qualifying PHC in the Federal District, given the nature of the established model.

Research conducted by the FD Planning Company (CODEPLAN) concluded that the users' perception of the public health system is directly linked to the home visits they receive in their homes: those who were visited use the service more, have a better relationship with the CHW, and evaluate the service provided better²³. A study by Furlanetto et al.²⁴ corroborates this finding, showing that user satisfaction was more significant for those who had received home visits.

One study weakness was the online collection after the social distancing measures were decreed to contain COVID-19. The typology proposed in the study is limited to the reality of the Federal District, which is a strength from the perspective of internal validity. Furthermore, the low external validity can be considered a weakness.

Final considerations

The complete FHT was considered the standard, with a sufficient number of CHW, in addition to the availability of the eSB and the reference EFHPCC team to establish a reference for what would be considered a quality PHC Unit structure and allow teams to develop their assignments.

The following parameters were also included: several registrations per team under local regulations, the provision of fundamental services, the availability of equipment and inputs specific to the PHC, a physical structure compatible with the number of PHC Unit teams, and available operating information and communication equipment.

The FD's PHC Unit structure typology shows its diversity, indicating which aspects of the structure of the services resources and efforts can be directed so that these do not limit the development of the full PHC potential.

With well-defined parameters guided by the reality of the PHC Unit in the FD, the FD's structure typology can identify characteristics of the Units and the structural differences between the health regions and thus support the direction of resources and actions to the structural aspects that appear most fragile. Classifying the PHC Units per their structural characteristics indicates the PHC Units that require structural improvements as a priority. It is an essential public management instrument, which, aligned with self-assessment, institutional support, and action plans conducted by the teams provided for in the Qualis-APS Program, will contribute significantly to improving PHC quality in the FD.

Finally, we should underscore that investments of the size presented in this study show the recognition of PHC as a structuring policy for the organization of the current health model, which should become standard practice in Brazilian municipalities. Therefore, we expect to contribute to inspiring the inclusion of PHC as a priority issue in research and management agendas.

Collaborators

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to the conception, planning, analysis, interpretation of data, writing of the manuscript, critical review of the content and approval of the final version of the manuscript. Lima AA (0000-0002-4125-6980)* contributed to the analysis, interpretation of data, writing of the manuscript, critical review of the content, and approval of the definitive version. ■

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