



## **TREND OF THE HOSPITALIZATIONS DUE TO AMBULATORY CARE SENSITIVE CONDITIONS IN PEDIATRICS IN *DISTRITO FEDERAL***

Lorena da Silva Luz Santos<sup>1,2</sup> 

Flávia Reis de Andrade<sup>3</sup> 

Marina Morato Stival<sup>1</sup> 

Tania Cristina Morais Santa Barbara Rehem<sup>1</sup> 

<sup>1</sup>Universidade de Brasília, Programa de Pós-graduação em Enfermagem. Brasília, Distrito Federal, Brasil.

<sup>2</sup>Secretaria de Saúde do Distrito Federal. Brasília, Distrito Federal, Brasil.

<sup>3</sup>Universidade de Brasília, Faculdade de Ceilândia, Curso de Saúde Coletiva. Brasília, Distrito Federal, Brasil.

### **ABSTRACT**

**Objective:** to analyze the trend of hospitalizations due to Ambulatory Care Sensitive Conditions in Pediatrics in *Distrito Federal*, during the 2008-2018 period.

**Method:** a time series study conducted between 2008 and 2018 with data from *Distrito Federal*, Brazil, in the age group from 0 to 14 years old. The data were collected in the SUS Hospital Information System, and they were used to perform trend analyses of the most frequent groups.

**Results:** there was a trend towards a significant increase in hospitalizations in the age group studied, with an annual percentage variation of 1.42% and a confidence interval between 0.05 and 2.81. Four groups of reasons for hospitalization and diagnoses were more frequent in the period, namely: bacterial pneumonias, infectious gastroenteritis and complications, pulmonary diseases, and asthma. Among the most frequent groups, considering the study period, there was a trend towards a significant increase in pulmonary diseases (15.71%; 12.40 and 19.12); a trend towards a significant reduction in infectious gastroenteritis and complications (-5.35%; -8.01 and -2.61); and a stationary trend in bacterial pneumonias (-0.43%; -3.80 and 3.07) and asthma (3.82%; -0.57 and 8.40).

**Conclusion:** the results of this study can contribute to the planning, evaluation and monitoring of primary care actions, as this indicator aims at indirectly evaluating access and effectiveness of this care level. In this sense, considering the results of the trend analysis performed, it can be concluded that they do not yet reflect the expected results with the expansion of FHS coverage.

**DESCRIPTORS:** Time series studies. Primary health care. Hospitalization. Health Indicator. Health evaluation. Pediatrics. Children's health.

**HOW CITED:** Santos LSL, Andrade FR, Stival MM, Rehem TCMSB. Trend of the hospitalizations due to ambulatory care sensitive conditions in pediatrics in *Distrito Federal*. *Texto Contexto Enferm* [Internet]. 2022 [cited YEAR MONTH DAY]; 31:e20210088. Available from: <https://doi.org/10.1590/1980-265X-TCE-2021-0088>

# TENDÊNCIA DAS INTERNAÇÕES POR CONDIÇÕES SENSÍVEIS À ATENÇÃO PRIMÁRIA EM PEDIATRIA NO DISTRITO FEDERAL

## RESUMO

**Objetivo:** analisar a tendência de internações por condições sensíveis à atenção primária em pediatria no Distrito Federal, no período de 2008 a 2018.

**Método:** estudo de séries temporais com dados do Distrito Federal, Brasil, na faixa etária de 0-14 anos, entre 2008 e 2018. Os dados foram coletados no Sistema de Informações Hospitalares do SUS, com os quais foram realizadas análises de tendência dos grupos mais frequentes.

**Resultados:** houve tendência de aumento significativa nas internações, na faixa etária do estudo, cuja variação percentual anual foi de 1,42% e intervalo de confiança entre 0,05 e 2,81. Quatro grupos de causas de internação e diagnósticos foram mais frequentes no período: pneumonias bacterianas, gastroenterites infecciosas e complicações, doenças pulmonares e asma. Entre os grupos mais frequentes, considerando o período do estudo, houve tendência de aumento significativa nas doenças pulmonares (15,71%; 12,40 e 19,12); tendência de redução significativa nas gastroenterites infecciosas e complicações (-5,35%; -8,01 e -2,61); e tendência estacionária nas pneumonias bacterianas (-0,43%; -3,80 e 3,07) e asma (3,82%; -0,57 e 8,40).

**Conclusão:** os resultados deste estudo podem contribuir no planejamento, avaliação e monitoramento das ações da atenção primária, visto que este indicador se propõe a avaliar indiretamente acesso e efetividade desse nível de atenção. Nesse sentido, considerando os resultados da análise de tendência realizada, pode-se concluir que os mesmos não refletem, ainda, os resultados esperados com a ampliação da cobertura de ESF.

**DESCRITORES:** Estudos de série temporal. Atenção primária à saúde. Hospitalização. Indicador de saúde. Avaliação em saúde. Pediatria. Saúde da criança.

# TENDENCIA DE LAS INTERNACIONES POR PATOLOGÍAS PASIBLES DE ATENCIÓN PRIMARIA EM PEDIATRÍA EN EL DISTRITO FEDERAL

## RESUMEN

**Objetivo:** analizar la tendencia de las internaciones por patologías pasibles de atención primaria en Pediatría en el Distrito Federal, en el período de 2008 a 2018.

**Método:** estudio de series temporales con datos del Distrito Federal, Brasil, en el grupo etario de 0 a 14 años, realizado entre 2008 y 2018. Los datos se recolectaron desde el Sistema de Información Hospitalaria del SUS, con los cuales se realizaron análisis de tendencia de los grupos más frecuentes.

**Resultados:** se registró una significativa tendencia de aumento en las internaciones, dentro del grupo etario del estudio, cuya variación porcentual anual fue del 1,42% con un intervalo de confianza entre 0,05 y 2,81. Cuatro grupos de causas de internación y diagnósticos fueron más frecuentes en el período, a saber: neumonías bacterianas, gastroenteritis infecciosas y complicaciones, enfermedades pulmonares y asma. Entre los grupos más frecuentes, considerando el período del estudio, hubo una significativa tendencia de aumento en las enfermedades pulmonares (15,71%; 12,40 y 19,12); así como una significativa tendencia decreciente en las gastroenteritis infecciosas y complicaciones (-5,35%; -8,01 y -2,61) y una tendencia estacionaria en las neumonías bacterianas (-0,43%; -3,80 y 3,07) y en el asma (3,82%; -0,57 y 8,40).

**Conclusión:** los resultados de este estudio pueden contribuir en la planificación, la evaluación y el control de las acciones en atención primaria, ya que la intención de este es evaluar indirectamente el acceso y la efectividad de este nivel de atención. En este sentido, y considerando los resultados del análisis de tendencia realizado, se puede concluir que dichos resultados todavía no reflejan los esperados con la ampliación de la cobertura de la ESF.

**DESCRIPTORES:** Estudios de series temporales. Atención primaria de la salud. Internación. Indicador de salud. Evaluación en salud. Pediatría. Salud infantil.

## INTRODUCTION

In Brazil, Primary Health Care (PHC) services were provided by the State Health Secretariats, with emphasis on the Ministry of Health's initiative with internalization of the Sanitation Actions Internalization Program (*Programa de Interiorização das Ações de Saúde e Saneamento*, PIASS) in 1976. Since the creation of the Unified Health System (*Sistema Único de Saúde*, SUS), the municipalities started getting involved with the provision of health services, with a priority for PHC. Thus, with the evolution of the SUS implementation process, PHC has been organized, with the Family Health Strategy (FHS) as a priority strategy, in an attempt to play the role of network organizer and care coordinator<sup>1</sup>. This fact has contributed to the improvement of the population's health conditions, as shown by several studies<sup>2-3</sup>.

Following the example of what has been happening in Brazil, over the years, *Distrito Federal* (DF) has been undergoing a reorganization process of its care model, with the launch of the *Brasília Saudável* program in 2016 as an important milestone, which is a set of actions aligned and coordinated by the State Health Secretariat, in strengthening the PHC, as an organizational strategy of the health care system, articulating and optimizing the Urgent and Emergency Care, Specialized Outpatient Care and Hospital Care services<sup>4-5</sup>.

This reorganization has implied the publication of norms, ordinances and training courses, among other actions, to discipline the conversion process of PHC in DF to the FHS model, with the following guidelines: welcoming, risk classification, resoluteness, territorialization, client adscription, guaranteed access, and ordering of the health care network<sup>6</sup>.

Regarding Pediatrics, DF has been structuring the network of services, aligned to the National Policy of Integral Attention to Child Health (*Política Nacional de Atenção Integral à Saúde da Criança*, PNAISC), in order to promote and protect children regarding the right to life and health, universal access to health, integrality of care, equality in health, facilitating environment to life, humanization of care, participatory management and social control. To such end, it has a multidisciplinary team, aiming at integrality, and nurses, among other duties, are responsible for providing health care to the child, both in the outpatient and inpatient health units, as well as in the community where the child lives, in order to perform health promotion and disease prevention actions<sup>7-8</sup>.

It is believed that the reorganization of the care model in DF will generate a positive impact on its health indicators<sup>5</sup>, including those related to Pediatrics. However, a set of structured research studies and evaluations is needed to demonstrate the results achieved and optimize the network with the necessary adjustments<sup>6</sup>.

In several countries, including Brazil, one of the indicators used to evaluate access and effectiveness of PHC is the one created by Billings and Teicholz in the United States, called Ambulatory Care Sensitive Conditions (ACSCs), from the concept of potentially preventable hospitalizations or Ambulatory Care Sensitive Conditions<sup>9</sup>.

In 2008, the Brazilian Ministry of Health (*Ministério da Saúde*, MS) initiated a discussion process for the adoption of this indicator by assembling a working group composed of MS technicians, managers and researchers, which drafted the first version of the Brazilian list of ACSCs. After submission to public consultation, the Brazilian list was published through Ordinance GM/MS No.221, dated April 17<sup>th</sup>, 2008, including 19 groups of reasons and diagnoses according to the International Classification of Diseases (ICD-10)<sup>10</sup>. Of the 19 groups of diagnoses, several include Pediatrics, such as immuno preventable diseases, whose hospitalizations can be reduced or even avoided through an accessible and effective PHC.

Although the MS defines that this indicator evaluates access and effectiveness of PHC, studies using this indicator reveal that these hospitalizations can occur due to several factors<sup>9</sup>, among which are those related to socioeconomic aspects of the population, in addition to the organization of the current care model in most Brazilian municipalities, with a biologist and hospital-centric focus, where lack of network articulation hinders PCH resoluteness, particularly with respect to medium-complexity outpatient care.

In this sense, considering the proposal to reorganize the care model in DF, this study aimed at analyzing the trend of sensitive conditions to primary care in Pediatrics in the *Distrito Federal*, in the 2008-2018 period.

## METHOD

This is a time series study conducted between 2008 and 2018 with data from the HACSCs in *Distrito Federal*, in the age group from 0 to 14 years old. The adoption of the age range from 0 to 14 years old had as reference the Children's Health Care Protocol of the State Health Secretariat of *Distrito Federal* (*Secretaria de Saúde do Estado do Distrito Federal, SES/DF*)<sup>7</sup>. The period studied corresponds to the interval between publication of the Brazilian List of HACSCs<sup>10</sup> and the last year with data available in the Hospital Information System of the Unified Health System (*Sistema de Informações Hospitalares/Sistema Único de Saúde, SIH/SUS*) at the time of the research. The codes set forth in the 10<sup>th</sup> International Classification of Diseases (ICD-10) cited in the aforementioned List were used.

The study was conducted based on the groups of reasons and diagnoses, according to ICD-10, included in the Brazilian List of HACSCs, namely: Diseases that are preventable by immunization and sensitive conditions; Infectious gastroenteritis and complications; Anemia; Nutritional deficiencies; Ear, nose and throat infections; Bacterial pneumonias; Asthma; Pulmonary diseases; Hypertension; Angina; Heart failure; Cerebrovascular diseases; Diabetes mellitus; Epilepsies; Kidney and urinary tract infections; Skin and subcutaneous tissue infections; Inflammatory disease in female pelvic organs; Gastrointestinal ulcer; and Diseases related to prenatal care and delivery<sup>10</sup>.

All data on HACSCs recorded in the SUS Hospital Information System (SIH) were collected, according to the gender and age group defined for the study; the exclusion criterion was those that presented inconsistency or were considered unknown. The Tabwin tool was used, made available for download by the Ministry of Health, and, subsequently, the data were introduced into Microsoft Excel, version 2007.

Initially, the absolute number of general hospitalizations and hospitalizations for Ambulatory Care Sensitive Conditions in the age group from 0 to 14 years old, both in general and by HACSC group in each year of the study, was adopted. From that starting point, the unadjusted HACSC rate was calculated by means of the ratio between the number of HACSCs in the age group analyzed and the reference population for the period, multiplied by 10,000, adjusted through the direct method by age group, with five-year intervals. For this, the number of inhabitants in this age group provided by the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística, IBGE*) was used, obtained in the 2010 Census and in the intercensal projections for the remaining years. The Segi World Population was used as a standard<sup>11</sup>.

Immediately after the descriptive analysis, the trend analysis was performed for those groups of reasons and diagnosis of HACSCs whose frequency was above 10%. Consequently, the following was adopted for this trend analysis: bacterial pneumonias, infectious gastroenteritis and complications, pulmonary diseases and asthma.

To calculate the Annual Percentage Variation (APV) of the rates, the Prais-Winsten method was used, which allows first-order autocorrelation correction. The dependent variable was the logarithm of the rates, and the independent variable, the years of the historical series. The APVs of the rates and the respective confidence intervals were obtained with the formulas proposed by Antunes and Waldman<sup>12</sup>:

$$-1 + 10^b = \Delta$$
$$\Delta IC95\% = -1 + 10^{(b \pm t * se)}$$

The “b” and standard error (se) values were obtained in the regression analysis. The “t” can be found in the Student’s t test distribution table. Based on this, it was verified whether there was an increasing, decreasing or stationary trend. A trend whose regression coefficient did not differ from zero ( $p > 0.05$ ) was considered stationary.

In order to improve visualization of the trends, the *LOWESS* (Locally Weighted Regression Scatter Plot Smoothing) smoothing method was used, with 5% bandwidth. The graphs were prepared in the R software (*astsa* package) and the trend analysis was performed in Stata, version 15.

This research was conducted with public access data; therefore, it was not submitted to any Research Ethics Committee.

## RESULTS

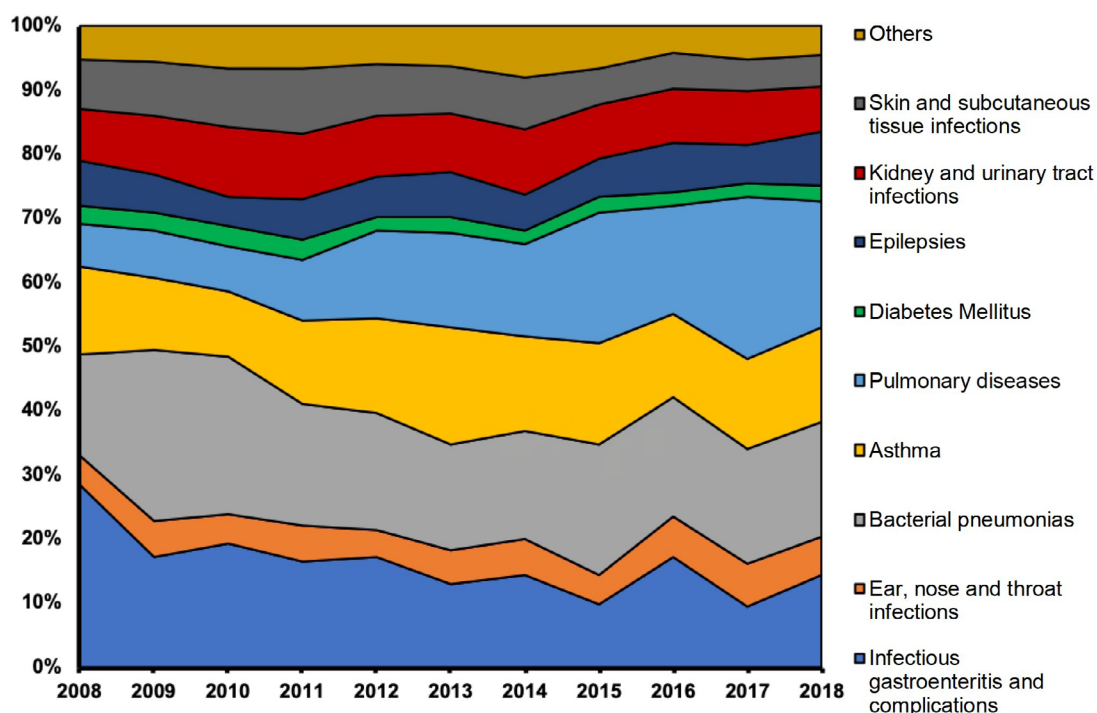
There were 2,061,470 hospitalizations in DF in the period under study, with 20% (419,956) in the age group from 0 to 14 years old. Of the total hospitalizations, 340,008 (16.5%) were due to ACSCs, of which 110,195 (32.4%) were in the age group studied.

Of the hospitalizations among children under 14 years old due to ACSCs between 2008 and 2018 in DF, 79,265 (71.9%) occurred in children under 4 years old, 20,697 (18.8%) from 5 to 9 years old, and 10,233 (9.3%) from 10 to 14 years old. The highest frequency of HACSCs was in the male gender, with 58,272 (52.9%). Therefore, it can be seen that, as age advances, the number of hospitalizations due to ACSC decreases. However, it is verified that, since 2016, the age group from 5 to 9 years old was the one that presented the highest proportion of HACSCs in relation to the total of hospitalizations.

Considering the total of hospitalizations, the years that presented the highest percentages of HACSCs were 2012 (29%), 2013 (29%) and 2015 (30%). In contrast, the lowest percentages were observed in the years 2017 (22%) and 2018 (23%), which may suggest a reduction in the HACSCs in relation to the total hospitalizations in the period observed.

When analyzing the HACSCs, it is verified that the four most frequent groups of reasons for hospitalization and diagnoses in the 0-14 age group in the period were as follows: bacterial pneumonias ( $n=21,117$ ; 19%), infectious gastroenteritis and complications ( $n=17,669$ ; 16%), pulmonary diseases ( $n=15,884$ ; 14%), and asthma ( $n=15,465$ ; 14%). Therefore, respiratory tract infections correspond to 47% of the HACSCs in this age group in *Distrito Federal*.

Figure 1 shows the distribution of the main groups of causes and diagnoses between 2008 and 2018. Throughout this period, an increase is verified in the proportion of pulmonary diseases, as well as a reduction in the proportion of infectious gastroenteritis and complications.



**Figure 1** – Distribution of the Hospitalizations due to Ambulatory Care Sensitive Conditions, according to cause. *Distrito Federal, Brazil, from 2008 to 2018.*

Source: SIH - DATASUS; <http://www.datasus.gov.br>

The HACSC rate in the age group from 0 to 14 years old rose from 157.4/10,000 inhabitants in 2008 to 198.2/10,000 inhabitants in 2018. Pulmonary diseases presented progressively increasing rates over the period analyzed, with rates of 10.9 and 39.2 per 10,000 in 2008 and 2018, respectively. On the other hand, a reduction is observed in the rates of the Infectious gastroenteritis group over time, from 44.7 in 2008 to 28.2 per 10,000 inhabitants in 2018 (Table 1).

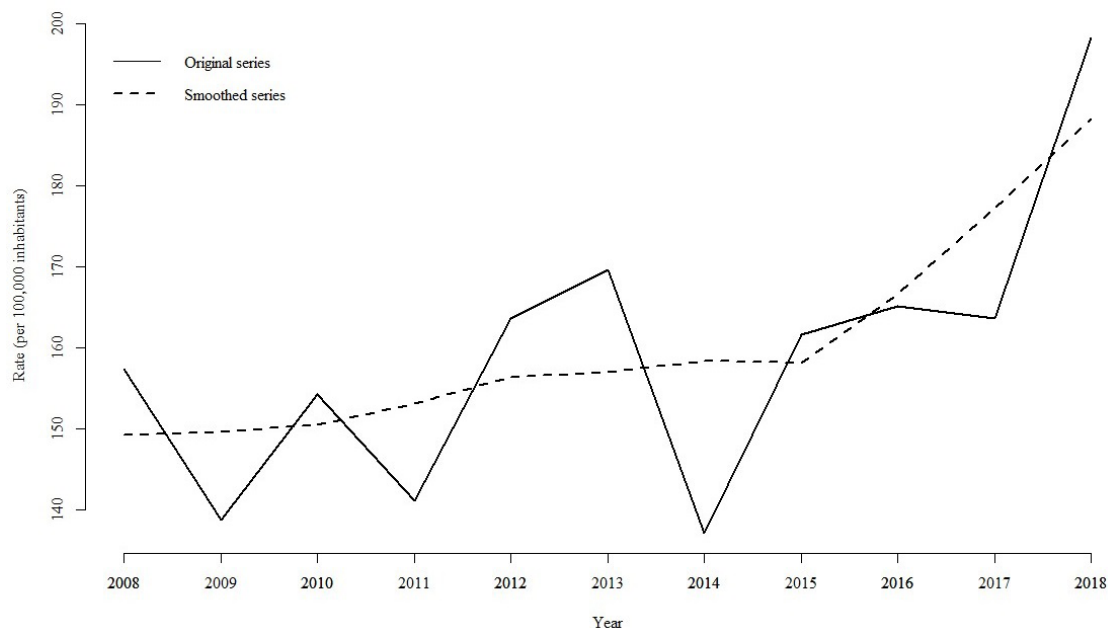
**Table 1** – Hospitalization rate corresponding to Hospitalizations due to Ambulatory Care Sensitive Conditions (per 10,000 inhabitants), according to groups of reasons for hospitalization and diagnoses, in the age group from 0 to 14 years old. *Distrito Federal, Brazil, from 2008 to 2018.*

Year	All the HACSC groups	Pulmonary diseases	Asthma	Infectious gastroenteritis and complications	Bacterial pneumonias
2008	157.4	10.9	21.5	44.7	24.6
2009	138.8	10.2	15.2	23.7	37.5
2010	154.3	11.1	15.4	29.9	37.8
2011	141.2	13.7	18.3	23.2	26.5
2012	163.6	21.9	24.4	27.9	29.9
2013	169.6	25.1	31.2	22.3	27.8
2014	137.2	19.4	20.3	19.6	23.1
2015	161.7	32.9	25.6	15.8	33
2016	165.1	28.1	21.6	28.3	30.4
2017	163.6	41.3	22.9	15.6	29.7
2018	198.2	39.2	29.5	28.2	35

Source: SIH - DATASUS; <http://www.datasus.gov.br>



The annual behavior of the time series corresponding to the HACSC rate in the age group from 0 to 14 years old can be seen in Figure 2. A gradual increase in the number of hospitalizations is noticed, with the highest rates in 2013 and 2018.



**Figure 2** – Time series of the Hospitalizations due to Ambulatory Care Sensitive Conditions in the age group from 0 to 14 years old. *Distrito Federal*, Brazil, from 2008 to 2018.

Source: SIH - DATASUS; <http://www.datasus.gov.br>

There was a trend toward a significant increase in HACSCs (APV of 1.42%; 95% CI: 0.05; 2.81) in the age group from 0 to 14 years old in DF during the period under study. Among the most frequent HACSC groups, there was a trend toward a significant increase in pulmonary diseases (APV of 15.71%; 95% CI: 12.40; 19.12). In contrast, infectious gastroenteritis and complications tended to decrease significantly (APV of -5.35%; 95% CI: -8.01; -2.61). Bacterial pneumonias (APV -0.43%; 95% CI: -3.80; 3.07) and asthma (APV 3.82%; 95% CI -0.57; 8.40) presented a stationary trend (Table 2).

**Table 2** – Trend of the rates corresponding to Hospitalizations due to Ambulatory Care Sensitive Conditions (per 10,000 inhabitants), according to group of diagnoses, in the age group from 0 to 14 years old. *Distrito Federal*, Brazil, from 2008 to 2018.

HACSC*	APV† (%)	95% CI‡	Interpretation
All the HACSC groups	1.42	0.05; 2.81	Increase
Bacterial pneumonias	-0.43	-3.80; 3.07	Stationary
Infectious gastroenteritis and complications	-5.35	-8.01; -2.61	Reduction
Pulmonary diseases	15.71	12.40; 19.12	Increase
Asthma	3.82	-0.57; 8.40	Stationary

Source: SIH - DATASUS; <http://www.datasus.gov.br> \*HACSC = Hospitalizations due to Ambulatory Care Sensitive Conditions; †APV = Annual Percentage Variation; ‡CI = Confidence Interval.

## DISCUSSION

This study revealed that, between 2008 and 2018, 16.5% of the total hospitalizations in DF were due to HACSCs, regardless of the age group.

When analyzing the data, in the pediatric age group of 0 to 14 years old adopted for this study, there was a trend of a major increase in hospitalizations due to ACSCs, reaching 198.2/10,000 inhabitants. Also in relation to the HACSC rates, there was a significant reduction in 2014, which may have been influenced by the progressive reduction of pediatrician hours in the emergency rooms, both in the ECUs and in the hospitals, with a consequent closure of beds between 2010 and 2015<sup>13</sup>.

Another study conducted with data from DF in the 2009-2018 period revealed that there was a reduction in the relative participation of HACSCs in the 50-59 and 60-69 age groups, as well as stability in the proportion of these hospitalizations among children and adolescents<sup>14</sup>.

When analyzing the results of the two aforementioned studies, where there was an increasing trend of hospitalizations in the pediatric group studied in the first, and stability of hospitalizations among children and adolescents in the second, it can be inferred that non-reduction of HACSCs for the age group less than or equal to 20 years old in DF in 2008-2018 period represents a difficulty of access, even though this population is a priority for primary care.

However, it is important to note that studies in other countries show a trend toward a reduction in HACSCs, although this reduction is less significant in the younger population, in which the main reasons for hospitalization are acute conditions<sup>15</sup>.

Focusing on the results of the present study, among the four most frequent groups of reasons for hospitalization and diagnoses, pulmonary diseases presented an increasing trend, converging with the result of a study carried out with HACSC data in Ceará<sup>16</sup>.

This increasing trend can be associated with several factors, such as the low penta- and tetra-valent vaccination coverage, which, according to yearly data from the National Immunization Program (*Programa Nacional de Imunização*, PNI) for DF, it is 79.5% (*Haemophilus influenzae b*) and 85.2% for Pneumo-10 (*Streptococcus pneumoniae*), respectively, with 95% being recommended by the PIN<sup>17</sup>.

Another aspect to be analyzed for the increasing trend of pulmonary diseases is the absence of vaccines against the main viral etiologic agent, the Respiratory Syncytial Virus (RSV) since, in 2017 it was found that RSV corresponded to 79.83% of the acute respiratory syndromes in DF<sup>18</sup>, which may justify the higher hospitalization rate due to pulmonary diseases (41.3/10,000 inhabitants) in this study.

To face this situation, it is necessary to adopt preventive measures such as basic hygiene care, social isolation, and passive immunization through the use of the monoclonal antibody during RSV seasonality<sup>19</sup>. In this sense, the actions to confront pulmonary diseases are included in the children's health protocol of DF<sup>6-8</sup>, and many of them are part of the scope of action of PHC.

The group of bacterial pneumonias appears in this and other national studies as the most frequent of the HACSCs in all age groups, especially in pediatric ones<sup>16,20-22</sup>. In DF, a stationary trend in the rates of bacterial pneumonia in children under 14 years of age is observed, which diverges from a study carried out with HACSC data in Ceará, where the rate tended to decrease<sup>16</sup>, and in Minas Gerais, where an increase was estimated for this group of diagnoses<sup>20</sup>.

The stationary trend of the hospitalization rate in DF can also be linked to the same vaccination coverage associated with bacterial etiologic agents of pulmonary diseases. However, further studies are needed to verify which etiologic agents are actually causing the increasing trend in pulmonary diseases, as bacterial pneumonias are the most frequent among the hospitalizations by group of Ambulatory Care Sensitive Conditions in the age group from 0 to 14 years old.



It is worth noting that the bacterial etiologic agents that comprise the ICD-10 of pulmonary diseases are the same as those in the group of bacterial pneumonias (*Haemophilus influenzae b* and *Streptococcus pneumoniae*)<sup>10</sup>. Therefore, the factors that are associated with the trend of bacterial pneumonias may be the same as those associated with pulmonary diseases by these agents.

Another group that presented a stationary trend in the HACSC rate was asthma. This group appears among the leading reasons for HACSCs in the pediatric age groups in Brazil<sup>16, 20–22</sup>. This result also appeared in the HACSC studies in Minas Gerais<sup>20</sup> whereas, in the HACSC study conducted in Ceará, it presents a decline in hospitalizations for this reason<sup>16</sup>.

To control this chronic disease, the Ministry of Health (MS) published the asthma Clinical Protocol and Therapeutic Guidelines, which consist of a combination of pharmacological and non-pharmacological courses of action, aiming at risk reduction and control, in which the management cycle involves evaluation, treatment adjustment and review response<sup>23</sup>. Although DF is following these recommendations, as verified in the asthma protocol<sup>24</sup>, there is a need to review the strategies for asthma control in order to reduce this hospitalization rate.

The state of Paraná was able to reduce the number of asthma-related hospitalizations after implementing a PHC program that aimed at changing asthma patient care practices, readjusting the local health system and training health professionals<sup>25</sup>.

The group of infectious gastroenteritis and complications is also among the leading reasons for HACSCs in Pediatrics in DF and Brazil, especially in children under 5 years of age<sup>21</sup>. However, there is a decreasing trend for this group in DF, as observed in studies conducted in Ceará<sup>16</sup> and Minas Gerais<sup>20</sup>.

*Distrito Federal* has been investing in basic sanitation throughout the years. Currently, most of the population is covered by regular garbage collection (94.58%), sewage collection and removal system (90.43%) and drinking water supply (98.18%)<sup>26</sup>. In addition to that, the water drainage system is being implemented, and 17.2% of the territory already enjoys this service<sup>27</sup>.

Considering that infectious and parasitic diseases are associated with socioeconomic and environmental conditions, the environment plays a determining role in dissemination of these diseases<sup>28</sup>. Thus, the advances in basic sanitation indicators, combined with the high urban development index (0.824)<sup>27</sup>, may have contributed to the decreasing trend in these hospitalization rates.

However, there is low vaccination coverage against human rotavirus, which in DF is 82%, below the national goal of 90% coverage<sup>18</sup>. This predisposes to fragility to face infectious gastroenteritis and can be associated with the high frequency of hospitalization cases, despite the decreasing trend.

Over the years, DF has invested in PHC, which can be evidenced by analyzing the increase in FHS coverage, which was only 28.17% in 2016 arose to 69.1% in 2018. It is expected that this expansion exerts positive impacts on all care lines<sup>5</sup>, including the pediatric population. However, from the results of this study, in which an increase in HACSCs was shown, especially in Pediatrics, there is still no progress with this expansion, even with the existence of a specific protocol for this age group, since 2016 and based on the PNAISC, in which there is a definition of care flow and technologies<sup>7</sup>.

The PNAISC reinforces that respiratory diseases are still among the main causes of illness and the first reason for seeking outpatient and emergency services, especially in regions and populations with greater vulnerability. In this sense, this policy reinforces the need for training the health team to qualify them for the care and managerial practice in PHC, especially the Family Health Teams (FHTs), in order to direct and organize the health service, intending to solve problems, including HACSCs. To such end, articulation between PHC and Specialized Outpatient Care becomes necessary<sup>8</sup>.

In addition to the PNAISC, the children's health protocol of DF provides actions such as the establishment of lines of care, spontaneous demand welcoming, home visits, growth and development monitoring, matrix support by dentists from the Dental Specialties Centers, pediatricians, nutritionists, social workers and psychologists from the NASF, among other professionals who support the PHC teams<sup>7-8</sup>. The protocol also determines the duties of each team member, focused on Pediatrics<sup>7</sup>.

For Nursing, it brings about the following as duties, among others: Nursing consultation to monitor child growth and development using the Systematization of Nursing Care (SNC), medication prescription, examination request, referral to other services, group activities in the BHU and in community spaces, permanent education and management of inputs required for maintenance of the BHU<sup>7</sup>. By performing these activities, Nursing will certainly contribute to reducing or avoiding HACSCs.

However, as already mentioned, the actions that exert an impact on the reduction of HACSCs are not only restricted to direct actions in the health area, but require intersectoral measures<sup>29</sup>.

This study was conducted with data from the SIH/SUS, classified as an administrative database for the health sector<sup>30</sup>. As such, it presents limitations in several aspects, from failures in filling out the data, underreporting and errors in notification, in addition to the limitation as to its coverage since, despite being a majority, it only includes admissions made in public hospitals or SUS providers. However, the SIH is the only database that aggregates microdata from the Hospital Admission Authorization (*Autorização de Internação Hospitalar*, AIH), with a consolidated historical series for the entire Brazilian territory.

## CONCLUSION

After performing the trend analysis of HACSCs in Pediatrics in DF, this study pointed out a significant increasing trend and, among the most frequent HACSCs, the group of pulmonary diseases stands out for this trend. In addition to that, it showed that bacterial pneumonias and asthma are on a stationary trend and that hospitalizations due infectious gastroenteritis and complications are trending downward.

In this sense, it appears that, like Brazil, DF lives with chronic and infectious-contagious diseases and that, despite the changes proposed to reorganize its health system, as of 2016, there are still many challenges to be faced, given the increasing trend of HACSCs in the pediatric context.

It is expected that this reorganization will expand PHC access and resoluteness, causing changes in the results of the HACSC indicator, in the case of this study, in the pediatric age group, since early diagnosis and proper monitoring can prevent or reduce hospitalizations.

Thus, the results herein found can contribute to discussions involving managers and workers, thus assisting planning, evaluation and monitoring, with a consequent redirection and necessary adjustments in the care network.

Finally, the results of this research can serve as a baseline for comparisons with future studies to be conducted in order to verify the trends of HACSCs in Pediatrics through implemented actions.

## REFERENCES

1. Tasca R, Ventura ILS, Borges V, Leles FAG, Rosane MG, Ribas NA, et al. Laboratórios de inovação em saúde: por uma Atenção Primária à Saúde forte no Distrito Federal, Brasil. *Cienc Saude Colet* [Internet]. 2019 Jun [cited 2021 Apr 03];24(6):2021-30. Available from: <https://doi.org/10.1590/1413-81232018246.08672019>
2. Oliveira BLCA, Cardoso LFC, Dominice RO, Corrêa AAP, Fonseca AEC, Moreira JPL, et al. A influência da Estratégia Saúde da Família no uso de serviços de saúde por adultos hipertensos no Brasil. *Rev Bras Epidemiol* [Internet]. 2020 [cited 2020 Dec 17];23:e200006. Available from: <https://doi.org/10.1590/1980-549720200006>
3. Pinto JEP, Aquino R, Medina MG, Silva MGC. Efeito da Estratégia Saúde da Família nas internações por condições sensíveis à atenção primária em menores de um ano na Bahia, Brasil. *Cad Saude Publica* [Internet]. 2018 [cited 2020 Dec 17];34(2):e00133816. Available from: <https://doi.org/10.1590/0102-311x00133816>
4. Secretaria do Estado de Saúde do Distrito Federal (BR). Brasília saudável: o fortalecimento da atenção primária à saúde [Internet]. Brasília, DF; 2016 Jun [cited 2020 Jun 20]. Available from: [https://www.coren-df.gov.br/site/wp-content/uploads/2016/06/BRASILIA\\_SAUDAVEL\\_DOCUMENTO\\_REFERENCIAL.pdf](https://www.coren-df.gov.br/site/wp-content/uploads/2016/06/BRASILIA_SAUDAVEL_DOCUMENTO_REFERENCIAL.pdf)
5. Corrêa DSRC, Moura AGOM, Quito MV, Souza HM, Versiani LM, Leuzzi S, et al. Movimentos de reforma do sistema de saúde do Distrito Federal: a conversão do modelo assistencial da Atenção Primária à Saúde. *Cienc Saude Colet* [Internet]. 2019 [cited 2020 Dec 17];24(6):2031-41. Available from: <https://doi.org/10.1590/1413-81232018246.08802019>
6. Secretaria do Estado de Saúde do Distrito Federal (BR). Portaria nº 77, de 14 de fevereiro de 2017: Estabelece a Política de Atenção Primária à Saúde do Distrito Federal. *Diário Oficial do Distrito Federal* [Internet]. Brasília, DF; 2017 Feb 15. nº 33, Seção 1, 2 e3 [cited 2020 Apr 20]. Available from: [http://www.buriti.df.gov.br/ftp/diariooficial/2017/02\\_Fevereiro/DODF%20033%2015-02-2017/DODF%20033%2015-02-2017%20INTEGRA.pdf](http://www.buriti.df.gov.br/ftp/diariooficial/2017/02_Fevereiro/DODF%20033%2015-02-2017/DODF%20033%2015-02-2017%20INTEGRA.pdf)
7. Secretaria do Estado de Saúde do Distrito Federal (BR). Portaria SES-DF Nº287 de 02 de dezembro de 2016: institui a Comissão Permanente dos Protocolos Assistenciais no ano de 2016. *Diário Oficial do Distrito Federal* [Internet]. Brasília; 06 dez. 2016b. nº 228, seção 1 p. 6. [cited 2020 Apr 20]. Available from: [http://www.saude.df.gov.br/wp-conteudo/uploads/2018/04/1.Atencao\\_a\\_Saude\\_da\\_Crianca.pdf](http://www.saude.df.gov.br/wp-conteudo/uploads/2018/04/1.Atencao_a_Saude_da_Crianca.pdf)
8. Ministério da Saúde (BR). Secretaria de Atenção à Saúde. Departamento de Ações Programáticas Estratégicas. Política Nacional de Atenção Integral à Saúde da Criança: orientações para implementação [Internet]. Brasília: Ministério da Saúde; 2018 [cited 2020 May 04]. Available from: <https://central3.to.gov.br/arquivo/494643/>
9. Maia LG, Silva LA, Guimarães RA, Pelazza BB, Pereira ACS, Rezende WL, et al. Internações por condições sensíveis à atenção primária: um estudo ecológico. *Rev Saude Pub* [Internet]. 2019 Sep [cited 2021 Feb 16];53:2. Available from: <https://doi.org/10.11606/S1518-8787.2019053000403>
10. Ministério da Saúde (BR). Portaria n.221, de 17 abril de 2008: publicar na forma do anexo desta Portaria, a Lista Brasileira de Internações por Condições Sensíveis à Atenção Primária. *Diário Oficial [da] República Federativa do Brasil* [Internet]. Brasília, DF; 2008 Sep 21. Seção 1. Pt. 50. [cited 2020 Feb 20]. Available from: [http://bvsms.saude.gov.br/bvs/saudelegis/sas/2008/prt0221\\_17\\_04\\_2008.html](http://bvsms.saude.gov.br/bvs/saudelegis/sas/2008/prt0221_17_04_2008.html)
11. World Health Organization (WHO). Age standardization of rates: a new who standard. GPE discussion paper series: nº 31 eip/gpe/ebd. World Health Organization [Internet]. 2001 [cited 2020 Jan 15]. Available from: <https://www.who.int/healthinfo/paper31.pdf>

12. Antunes JL, Waldman EA. Trends and spatial distribution of deaths of children aged 12-60 months in São Paulo, Brazil, 1980-98. *Bull World Health Organ* [Internet]. 2002 [cited 2020 Jan 15];80(5):391-8. Available from: <https://apps.who.int/iris/handle/10665/268779>
13. Souza RR, Vieira MG, Lima CJF Jr. A rede de atenção integral à saúde da criança no Distrito Federal, Brasil. *Cienc Saude Colet* [Internet]. 2019 Jun 27 [cited 2021 May 23];24(6):2075-84. Available from: <https://doi.org/10.1590/1413-81232018246.09512019>.
14. Pinto LF, Mendonça CS, Rehem TCMSB, Stelet B. Internações por Condições Sensíveis à Atenção Primária (ICSAP) no Distrito Federal: comparação com outras capitais brasileiras no período de 2009 a 2018. *Cien Saude Colet* [Internet]. 2019 Jun 27 [cited 2021 Apr 03];24(6):2105-114. Available from: <https://doi.org/10.1590/1413-81232018246.08582019>
15. González-Vélez AE, Mejía CCC, Padilla EL, Marín SYM, Bobadilla PAR, Sánchez JPR, et al. Ambulatory care sensitive conditions hospitalization for emergencies rates in Colombia. *Rev Saude Publica* [Internet]. 2019 May 15 [cited 2021 Sep 1];53:36. Available from: <https://doi.org/10.11606/S1518-8787.2019053000563>
16. Costa LQ, Pinto EP Jr, Silva MGC. Tendência temporal das Internações por Condições Sensíveis à Atenção Primária em crianças menores de cinco anos de idade no Ceará, 2000 a 2012. *Epidemiol Serv Saude* [Internet]. 2017 Jan-Mar [cited 2021 Apr 03];26(1):51-60. Available from: <https://doi.org/10.5123/s1679-49742017000100006>
17. Secretaria de Saúde do Distrito Federal (BR). Subsecretaria de Vigilância a Saúde. Análise dos indicadores de imunização de 2018 – dados parciais. *Informativo de imunizações* [Internet]. 2019 Feb [cited 2020 May 23];1(1). Available from: <http://www.saude.df.gov.br/wp-conteudo/uploads/2018/05/Boletim-Imuniza%C3%A7%C3%B5es-Final-2018.pdf>
18. Secretaria de Saúde do Distrito Federal (BR). Subsecretaria de Vigilância à Saúde. *Boletim Epidemiológico Gripe SE 15/2017* [Internet]. 2017 Apr [cited 2020 Jun 21]. Available from: <http://www.saude.df.gov.br/wp-conteudo/uploads/joomla/d3360cfb718abdeea095bcb21d981c71.pdf>
19. Ministério da Saúde (BR). Portaria conjunta SAS/MS nº 23, de 3 de outubro de 2018: aprova o protocolo de uso do palivizumabe para a prevenção da infecção pelo vírus sincicial respiratório. *Diário Oficial [da] República Federativa do Brasil* [Internet]. Brasília; 2019 Oct 10. Seção 1, ed.196, p. 63 [cited 2020 Jun 23]. Available from: <http://portalarquivos2.saude.gov.br/images/pdf/2018/outubro/10/Portaria-Conjunta-n23-outubro.2018.pdf>
20. Santos LA, Oliveira VB, Caldeira AP. Hospitalizations for conditions susceptible to primary care among children and adolescents in Minas Gerais, Brazil, 1999-2007. *Rev Bras Saude Mater Infant* [Internet]. 2016 Apr-Jun [cited 2021 Apr 03];16(2):169-78. Available from: <https://doi.org/10.1590/1806-93042016000200006>
21. Pedraza DF, Araujo EMN. Internações das crianças brasileiras menores de cinco anos: revisão sistemática da literatura. *Epidemiol Serv Saude* [Internet]. 2017 Jan-Mar [cited 2021 Apr 03];26(1):169-82. Available from: <https://doi.org/10.5123/s1679-49742017000100018>
22. Macedo JCB, Arcêncio RAI, Wolkers PCB, Ramos ACV, Toninato APC, Furtado MCC. Factors associated with pneumonia and diarrhea in children and quality of primary health care. *Texto Contexto Enferm* [Internet]. 2019 [cited 2021 Apr 03];28:e20180225. Available from: <https://doi.org/10.1590/1980-265x-tce-2018-0225>.
23. Ministério da Saúde (BR). Portaria SAS/MS nº 1.317, de 25 de novembro de 2013: Protocolo clínico e diretrizes terapêuticas da asma. *Diário Oficial [da] República Federativa do Brasil, Poder Executivo* [Internet]. Brasília, DF; 2013 Nov 25 [cited 2018 Mar 25]. Available from: [https://bvsms.saude.gov.br/bvs/saudelegis/sas/2013/prt1317\\_25\\_11\\_2013.html](https://bvsms.saude.gov.br/bvs/saudelegis/sas/2013/prt1317_25_11_2013.html)
24. Secretaria de Saúde do Distrito Federal (BR). Asma: programa de atendimento ao paciente asmático do DF (PAPA-DF) [Internet]. Brasília; 2017 Sep 27 [cited 2018 Aug 27]. Available from: <http://www.saude.df.gov.br/programas-asma/>

25. Nazario NO, Queiroz LNOL, Ghizzo J Filho, Traebert, JL. Tendência temporal de internação por asma em adultos, no período 2008-2015, no estado de Santa Catarina, Brasil. *Arq Catarin Med* [Internet]. 2018 Jul-Sep [cited 2020 Mar 25];47(3):85-99. Available from: [https://repositorio.animaeducacao.com.br/bitstream/ANIMA/2684/1/2018\\_Nazario\\_Traebert\\_tend%c3%aancia\\_asma.pdf](https://repositorio.animaeducacao.com.br/bitstream/ANIMA/2684/1/2018_Nazario_Traebert_tend%c3%aancia_asma.pdf)
26. Secretaria de Economia do Distrito Federal (BR). Companhia de planejamento do Distrito Federal (CODEPLAN). Brasília/DF em dados. [Internet] [cited 2020 May 22]. Available from: <http://brasiliadfemdados.codeplan.df.gov.br/#/tema/17>
27. Distrito Federal (BR). Plano Distrital de Saneamento Básico. Serenco: Serviço de Engenharia Consultiva [Internet]. 2017 Sep [cited 2020 May 24]. Available from: [http://www.adasa.df.gov.br/images/Produtos-PDSB/Produto\\_7/1\\_PDSB\\_DF\\_subproduto\\_7.1\\_0717\\_VF\\_DIGITAL.pdf](http://www.adasa.df.gov.br/images/Produtos-PDSB/Produto_7/1_PDSB_DF_subproduto_7.1_0717_VF_DIGITAL.pdf)
28. Souza HP, Oliveira WTGH, Santos JPC, Toledo JP, Ferreira IPS, Esashika SNGS, et al. Doenças infecciosas e parasitárias no Brasil de 2010 a 2017: aspectos para vigilância em saúde. *Rev Panam Salud Publica* [Internet]. 2020 Feb 10 [cited 2020 Dec 17];44:e10. Available from: <https://doi.org/10.26633/RPSP.2020.10>
29. Morimoto T, Costa JSD. Internações por condições sensíveis à atenção primária, gastos com saúde e Estratégia Saúde da Família: uma análise de tendência. *Cienc Saude Colet* [Internet]. 2017 Mar [cited 2021 Feb 16];22(3):891-900. Available from: <https://doi.org/10.1590/1413-81232017223.27652016>
30. Rehem TCMSB, Oliveira MRF, Ciosak SI, Egry EY. Registro das internações por condições sensíveis à atenção primária: validação do sistema de informação hospitalar. *Rev Latino-Am Enferm* [Internet]. 2013 Sep-Oct [cited 2021 Aug 31];21(5):1159-64. Available from: <https://doi.org/10.1590/S0104-11692013000500020>

## NOTES

### ORIGIN OF THE ARTICLE

Extracted from the dissertation - Trend of the hospitalizations due to Ambulatory Care Sensitive Conditions in Pediatrics in *Distrito Federal*", presented at the Graduate Program in Nursing of *Universidade de Brasília*, in 2020

### CONTRIBUTION OF AUTHORITY

Study design: Santos LSL, Rehem TCMSB.

Data collection: Santos LSL.

Data analysis and interpretation: Santos LSL, Rehem TCMSB, Andrade FR.

Discussion of the results: Santos LSL, Rehem TCMSB.

Writing and/or critical review of the content: Santos LSL, Rehem TCMSB, Andrade FR, Stival MM.

Review and final approval of the final version: Rehem TCMSB.

### ETHICS COMMITTEE IN RESEARCH

This research was conducted with public access data; therefore, it was not submitted to any Research Ethics Committee.

### CONFLICT OF INTEREST

There is no conflict of interest.

### EDITORS

Associated Editors: Natália Gonçalves, Monica Motta Lino.

Editor-in-chief: Roberta Costa.

### HISTORICAL

Received: April 07, 2021

Approved: October 19, 2021

### CORRESPONDING AUTHOR

Lorena da Silva Luz Santos

lorenadasilvaluz@hotmail.com

