



Admissions to the SUS for Primary Care-Sensitive Conditions in Paraná before and during the COVID-19 pandemic

Internações no SUS por Condições Sensíveis à Atenção Primária no Paraná antes e durante a pandemia de COVID-19

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ABSTRACT

This descriptive study aimed to analyze hospital admissions for primary care-sensitive conditions (PCSCs) in the pre-pandemic biennium (2018-2019) and the first biennium of the COVID-19 pandemic (2020-2021) in the state of Paraná, Brazil. It examined the causes of hospital admissions using the Unified Health System's Information System (DATASUS) and the Hospital Information System. The period from 2018 to 2021 was analyzed according to the ICD-10 morbidity list classification and the Brazilian List of Conditions Sensitive to Primary Care. A general decline in admissions for PCSCs before and during the pandemic was observed. The most significant drops were in admissions for bacterial types of pneumonia, while those least significant were for diseases related to prenatal care and childbirth. The overall decline indicates that Primary Care maintained continuity of care. The importance of strengthening Primary Care is emphasized, investing in the expansion, qualification of professionals, and overcoming structural weaknesses to prevent health complications.

Keywords: Primary Health Care; Covid-19; International Classification of Diseases; Primary Care-Sensitive Hospitalizations; Descriptive Epidemiology.

RESUMO

Estudo descritivo, que objetivou analisar internações hospitalares por condições sensíveis à APS no biênio pré-pandêmico (2018 – 2019) e no primeiro biênio da pandemia de Covid-19 (2020 – 2021) no Paraná. Analisou-se causas de internações hospitalares, usando Sistema de Informação do Sistema Único de Saúde (DATASUS), e Sistema de Informações Hospitalares. Utilizou-se período de 2018 a 2021 segundo classificação da Lista de morbidade do CID-10 e a Lista Brasileira de Condições Sensíveis à Atenção Primária. Verificou-se queda geral nas internações por causas sensíveis à Atenção Primária à Saúde antes e durante a pandemia. As quedas mais expressivas foram nas internações por pneumonias bacterianas, enquanto a menos expressiva foi de doenças relacionadas ao pré-natal e parto. A queda geral indica que a Atenção Primária manteve continuidade do cuidado. Reforça-se a importância de fortalecer a APS, investindo na expansão, qualificação dos profissionais e superação de fragilidades estruturais para prevenir agravamentos de saúde.

Palavras-chave: Atenção Primária; Classificação Internacional de Doenças; Condições Sensíveis à Atenção Primária; Covid-19; Epidemiologia Descritiva.

INTRODUCTION

In the 1990s, at New York University, John Billings developed the term Ambulatory Care-Sensitive Conditions (ACSCs) to identify health conditions where the need for hospitalization could be avoided if they were previously subjected to appropriate management, treatment, and ambulatory intervention.¹ Subsequently, in 2008, Brazil developed the List of Primary Care-Sensitive Conditions (PCSCs), which began to characterize conditions in groups based on causes of hospital admissions and diagnoses, considering the Tenth Revision of the International Classification of Diseases (ICD-10).²

This list has been used to assess the nature of admissions that could be contained through effective services offered by Primary Health Care (PHC)³. There is consensus in the scientific literature that PHC should provide comprehensive, accessible, and community-based care, addressing 80% to 90% of an individual's health needs throughout their life.⁴ Achieving such breadth requires actions beyond curative care, including strong articulation with Health Promotion actions so that health determinants and local sanitary conditions can be considered in the planning and execution of the service agenda. It is believed that a PHC capable of integrating health surveillance, health promotion, curative actions, and rehabilitation, even in the face of structural and resource challenges, has the potential to reduce unnecessary hospitalizations in its area.⁵

Therefore, it is believed that when this level of care utilizes all available resources to act efficiently and effectively, it is possible to reduce the morbidity of chronic diseases. Understanding the sensitive aspects of the ambulatory setting and preventable cases of hospital admissions, various countries, such as Portugal, the United States of America, Australia, among others, use Hospital Admissions for Primary Care-Sensitive Conditions (PCSC Admissions) as a tool to monitor the effectiveness of primary care. However,

comparisons between nations are complicated due to the distinct specificities according to the demands of each health system.⁵

Thus, the analysis of PCSCs also allows for the indirect evaluation of the quality of service at this level of care, highlighting problems with access to services, continuity of care, the effectiveness of offered treatments, and coordination between different levels of care. These issues often lead to an increase in the rate of admissions for conditions that could be avoided through the applicability of actions and policies already widely established.^{3,2}

Among the responsibilities of PHC, regarding the control of non-communicable chronic diseases, are prophylaxis, management, treatment, and follow-up of various diagnoses present in the current PCSC List, such as diabetes mellitus, arterial hypertension, heart failure, asthma, other airway diseases, and other immunizable diseases and their respective complications⁸. Furthermore, considered a severe acute respiratory syndrome (SARS) included in the ICD-10, the infection caused by SARS-CoV-2, the precursor of COVID-19, emerged at the end of 2019 in Wuhan, China. The outbreak was declared a Public Health Emergency of International Importance by the WHO on January 30, 2020,^{9,10} and a pandemic on March 11, 2020.¹¹ In Brazil, a National Public Health Emergency was declared in February 2020.

In response to this scenario, on February 6, 2020, Law No. 13.979 (Quarantine Law) was approved, aiming to halt the advancement of contamination and flatten the epidemic curve, leading to a reduction in the number of cases, hospital admissions, and the demand for Intensive Care Unit beds, and consequently, in the number of deaths caused by the new virus.¹² Regarding the surveillance and control of the COVID-19 epidemic situation, the law included key actions such as social isolation, quarantine, compulsory notification of confirmed cases of COVID-19 infection, epidemiological study or investigation, among others.^{12,9,13}

These measures extended to all SUS healthcare network services, including PHC, which should exceptionally redirect its actions towards identifying individuals with respiratory symptoms and referring them to services responsible for carrying out COVID-19 diagnostics.¹² Due to the emergency nature of PHC's response to suspected or diagnosed COVID-19 cases, as well as national health recommendations for isolation and social distancing and the suspension of health actions not related to the pandemic, chronic conditions were deprioritized, and comprehensive care was fragmented.¹⁴

Consequently, the significant increase in the number of cases and deaths from COVID-19 during the first epidemic years in Brazil, 2020 and 2021, weakened the services and health systems, especially due to interruptions in routine basic care, which could lead to an increase in PCSC admissions.¹⁵ Thus, it can be inferred that PHC's insufficiency in dealing with the new and growing demand led to a greater need for assistance at other points of care, such as emergency services, and short, medium, and long-term hospitalizations.¹⁵

According to Mendes,¹⁶ the halt in care for chronic conditions, especially in PHC because of COVID-19, involves the worsening of chronic conditions leading to preventable deaths. From the author's perspective, chronic conditions such as cardiovascular diseases, diabetes, respiratory diseases, cancer, obesity, chronic kidney diseases, frailty in older people, and others, are significant risk factors concerning COVID-19, further straining the response capacity of health services and systems.¹⁶

Given this situation, it is questioned: May public policies encouraging social isolation and quarantine as strategies to combat the COVID-19 pandemic in Brazil have influenced the rates of hospital admissions for primary care-sensitive conditions?

In this context, the objective of this study was to analyze hospital admissions for primary-care-sensitive conditions in the pre-pandemic

biennium (2018-2019) and the first biennium of the COVID-19 pandemic (2020-2021) in the state of Paraná (PR), Brazil.

METHODOLOGY

This is a descriptive study with a quantitative approach using secondary data, whose units of analysis were the causes of PCSC admissions in Paraná. Data were obtained from the Hospital Information System (SIH/SUS), available in the public database of the Unified Health System (DATASUS) of the Ministry of Health.

Data collection took place on August 20, 2022. The SIH/SUS website was accessed, and in the "Health Information" section, under "Epidemiological and Morbidity Information," options corresponding to "SUS hospital morbidity ("General, by place of admission – from 2008") were listed, selecting the ICD-10 Morbidity List, year of care, and admissions.

For this purpose, diagnoses listed in the Ministry of Health's Ordinance GM/MS No. 221, dated April 17, 2008, were considered, including: 1) Immunizable diseases, 2) Avoidable conditions, 3) Infectious gastroenteritis and complications, 4) Anemia, 5) Nutritional deficiencies, 6) Ear, nose and throat infections, 7) Bacterial types of pneumonia, 8) Asthma, 9) Lower airway diseases, 10) Hypertension, 11) Angina pectoris, 12) Heart failure, 13) Cerebrovascular diseases, 14) Diabetes mellitus, 15) Epilepsy, 16) Kidney and urinary tract infection, 17) Skin and subcutaneous tissue infection, 18) Inflammatory disease of female pelvic organs, 19) Gastrointestinal ulcer, and 20) Conditions related to prenatal and childbirth.¹⁷

In addition, PCSC admissions in SUS-linked services for the years 2018, 2019, 2020, and 2021 in all municipalities of Paraná were included, using the ICD-10 Morbidity List in accordance with the List of Primary Care-Sensitive Conditions, as per Ordinance GM/MS No.

221/2008.¹⁷ General admissions in the same years were also raised as a divisor in the calculation of hospitalization coefficients.

For the analysis, data were recorded in an Excel spreadsheet, and proportion coefficients for each PCSC diagnostic group were calculated, using the ratio between these and the total admissions for all PCSCs and according to general admissions, for each year studied, finally multiplying by the constant 100.

From this database, the simple frequency of PCSC admissions was described, and the variation between admissions during the years covered by the research was calculated.

To better understand the percentage variations of PCSC admissions between the years 2018-2019 and 2020-2021, the following formula was used to elucidate the differences between the years, where “initial V” corresponds to the year 2021 and “final V” to the year 2018, and the *i* being the variation:

$$i = \frac{V_{final} - V_{inicial}}{V_{inicial}} \times 100\%$$

The results were inserted into an Excel spreadsheet, analyzed according to descriptive statistics through simple frequency, presented in tables, and discussed in light of relevant and up-to-date literature, with a special focus on their implications for health service practices at the Primary Care level, in the context of these conditions sensitive to it.

In line with National Health Council Resolution No. 466, dated December 12, 2012, since it uses secondary data in which no information can identify individuals, submission to the Research Ethics Committee was waived.

RESULTS

Between the years 2018 and 2021, there were 3,252,609 hospitalizations reported in Paraná for various causes, of which 605,301 were due to PCSC, representing 18.6%. Throughout the study period, it is noted that the percentage decreased, as PCSC admissions accounted for 21.3% of admissions in 2018; 20.9% in 2019, 17.4% in 2020, and 14.2% in 2021.

In Figure 1, although it represents a significant portion of hospital admissions, the pandemic biennium brought a visible reduction in PCSC.

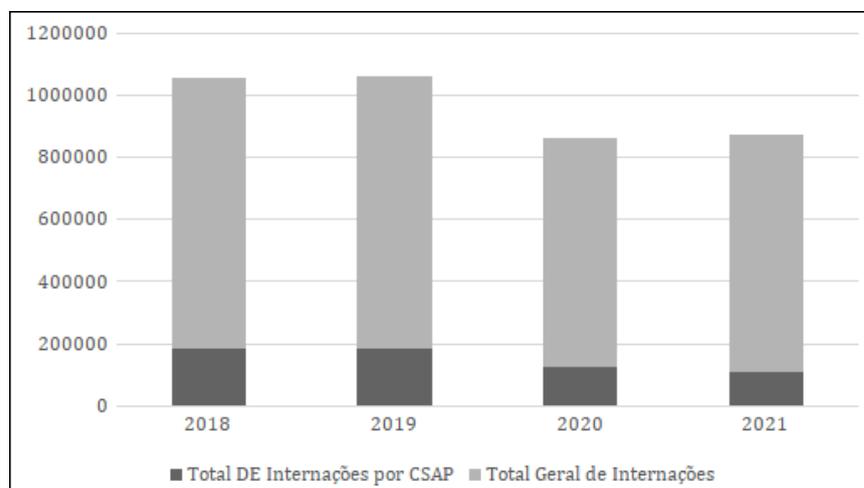


Figure 1. Distribution of PCSC and its relation to general hospitalizations, by year of occurrence in Paraná. Paraná, 2022. Source: Hospital Information System of the Unified Health System (SIH/SUS)/DATASUS/PR-2022. [Legenda: Total Admissions for PCSC; Total General Admissions]

Furthermore, Table 1 shows that PCSCs, whether analyzed individually or from the perspective of their coefficients, show a decrease

in the pandemic biennium across all diagnostic groups. It is noteworthy that although there is an increase in hospital admissions in most groups in

2019 compared to 2018, there is a deceleration in absolute values and hospital admissions coefficients in the following two years.

Among the most significant values, bacterial types of pneumonia stand out, representing 5.5% of hospital admissions in 2018, dropping to 2.5% in 2021. Following this, the

diagnostic groups of angina pectoris, heart failure, and cerebrovascular diseases are observed, which together contributed to 7.7% of admissions in 2018, experiencing a smaller decrease in 2021 (6.0%) compared to the previously mentioned period (Table 1).

Table 1. Distribution of total admissions for PCSC in Paraná in the years 2018, 2019, 2020, and 2021 by diagnostic group, and coefficients according to the total admissions for PCSC that year and total general admissions each year - Paraná, 2022

Diagnostic Groups	2018			2019			2020			2021		
	Total	Coef 1*	Coef 2**									
1. Immunizable diseases	459	0.25	0.05	481	0.26	0.05	326	0.25	0.04	226	0.21	0.03
2. Avoidable conditions	976	0.53	0.11	914	0.50	0.10	939	0.73	0.13	904	0.83	0.12
3. Infectious gastroenteritis and complications	7014	3.79	0.81	7179	3.91	0.82	4532	3.54	0.61	3883	3.57	0.51
4. Anemia	977	0.53	0.11	1032	0.56	0.12	845	0.66	0.12	857	0.79	0.11
5. Nutritional deficiencies	1873	1.01	0.22	1908	1.04	0.22	1626	1.27	0.22	1520	1.40	0.20
6. Ear, nose, and throat infections	5844	3.16	0.67	6428	3.50	0.73	2680	2.09	0.36	2378	2.19	0.31
7. Bacterial types of pneumonia	48665	26.31	5.60	47196	25.71	5.37	24409	19.07	3.31	19085	17.54	2.49
8. Asthma	5628	3.04	0.65	4734	2.58	0.54	2979	2.33	0.40	2816	2.59	0.37
9. Lower airway diseases	15826	8.56	1.82	14693	8.00	1.67	8287	6.47	1.12	7624	7.01	0.99
10. Hypertension	4596	2.48	0.53	4271	2.33	0.49	3526	2.75	0.48	2953	2.71	0.39
11. Angina pectoris	27634	14.94	3.18	27972	15.24	3.18	19875	15.53	2.70	15710	14.44	2.05
12. Heart failure	22860	12.36	2.63	23028	12.55	2.62	19509	15.24	2.65	15587	14.33	2.03
13. Cerebrovascular diseases	16664	9.01	1.92	17107	9.32	1.95	15687	12.25	2.13	14826	13.63	1.93
14. Diabetes mellitus	7832	4.23	0.90	7914	4.31	0.90	7113	5.56	0.97	6699	6.16	0.87
15. Epilepsies	5739	3.10	0.66	6058	3.30	0.69	5173	4.04	0.70	5028	4.62	0.66
16. Kidney and urinary tract infection	5062	2.74	0.58	5098	2.78	0.58	4436	3.46	0.60	3489	3.21	0.46
17. Skin and subcutaneous tissue infection	4261	2.30	0.49	4474	2.44	0.51	3441	2.69	0.47	2783	2.56	0.36
18. Inflammatory disease of female pelvic organs	1420	0.77	0.16	1376	0.75	0.16	992	0.77	0.13	909	0.84	0.12
19. Gastrointestinal ulcer	674	0.36	0.08	720	0.39	0.08	549	0.43	0.07	610	0.56	0.08
20. Conditions related to prenatal and childbirth	963	0.52	0.11	954	0.52	0.11	1088	0.85	0.15	898	0.83	0.12
Total Admissions for PCSC	184.967			183.537			128.012			108.785		
Total General Admissions	869.462			879.613			736.937			766.597		

Table 2 represents the absolute percentage variation of each PCSC cause/diagnosis between the years 2018, before the COVID-19 pandemic, and 2021, the last year of the first pandemic biennium. The diagnostic groups with the most significant percentage decreases in PCSC admissions were those with the highest absolute values and the lowest relative values among the analyzed groups. In this order,

they are: Bacterial types of pneumonia; Ear, nose, and throat infections; and Lower airway diseases.

Examining the results of the diagnostic groups with the smallest percentage decreases, there are the groups that generally presented the least significant absolute numbers of PCSC admissions. These include: Conditions related to prenatal and childbirth, followed by Avoidable conditions and Gastrointestinal ulcer.

Table 2. Variation in the number of admissions for primary care-sensitive conditions (PCSC) in Paraná between the years 2018 and 2021, separated by diagnostic groups - Paraná, 2022

Diagnostic Groups	2018	2021	Variation (%)
1. Immunizable diseases	459	226	-50.8
2. Avoidable conditions	976	904	-7.4
3. Infectious gastroenteritis and complications	7014	3883	-51.8
4. Anemia	977	857	-12.3
5. Nutritional deficiencies	1873	1520	-18.8
6. Ear, nose, and throat infections	5844	2378	-59.3
7. Bacterial types of pneumonia	48665	19085	-60.8
8. Asthma	5628	2816	-49.9
9. Lower airway diseases	15826	7624	-51.8
10. Hypertension	4596	2953	-35.7
11. Angina pectoris	27634	15710	-43.1
12. Heart failure	22860	15587	-31.2
13. Cerebrovascular diseases	16664	14826	-11.0
14. Diabetes mellitus	7832	6699	-14.5
15. Epilepsies	5739	5028	-12.4
16. Kidney and urinary tract infection	5062	3489	-31.1
17. Skin and subcutaneous tissue infection	4261	2783	-34.7
18. Inflammatory disease of female pelvic organs	1420	909	-36.0
19. Gastrointestinal ulcer	674	610	-9.5
20. Conditions related to prenatal and childbirth	963	898	-6.7

Source: Hospital Information System of the Unified Health System (SIH/SUS)/DATASUS/PR-

DISCUSSION

The findings of this study highlight that hospital admissions for PCSC in Paraná between 2018 and 2021 tended to decrease regardless of

the diagnostic cause group. This trend has been observed in other studies conducted in different locations. For example, in the city of Senador Canedo (GO), there was a decrease of 87.56% in PCSC admissions. In the medical clinic unit of the

university hospital in Juiz de Fora (MG) and the state of Rio Grande do Norte, there was a 41.18% reduction in admissions; and in the southern region of the state of Rio de Janeiro, the reduction was 10%^{18, 19, 20, 21}.

The studies mentioned, corroborated by the results found in the current research, indicate a reduction in PCSC admission rates, highlighting that, even in the pandemic scenario, this behavior persisted. In general, the slowdown in PCSC admission rates would indicate increased access to primary health care and improvements in its performance; and the ability to remain resolute, even in a pandemic scenario.²²

In this sense, it is essential to reflect on this finding, as, despite the COVID19 pandemic weakening PHC and its professional team, studies still demonstrate the strategic role of this service in directly addressing the pandemic, without compromising conditions and issues considered sensitive to this level of care. PHC reinvented itself through adaptation to new demands, the development of new strategies, and mechanisms that bring services and the population closer.²³

Thus, the various impacts on health caused by COVID-19 are evident, requiring a multiprofessional approach to comprehensive care, including accurate diagnosis, effective treatment, emotional support, and preventive education. To ensure the comprehensiveness of care in PHC and to ensure its quality across all three levels of health care, it is necessary to form a multiprofessional team with technical skills and knowledge capable of identifying problems and providing effective care, enabling them to meet the real demands of the users and the territory under their responsibility.

The action of the multiprofessional team involves prevention, early diagnosis, and effective management of conditions that, if not properly treated, could increase morbidity and mortality. The goal of the multidisciplinary team is to reduce the need for hospital interventions, emphasizing a preventive and

integrated approach to optimize the health of the community served in PHC. Moreover, such a team must be capable of transforming their daily work, redefining care practices, and operationalizing care through organizational arrangements and re-arrangements, to meet community demands.²⁴

Despite attempts at full coverage by the Family Health Strategy (ESF) to curb the increase in PCSCs, it is still necessary to develop actions that are effective for the control of such health conditions, as prevention and treatment are important roles of PHC. This failure is linked to the performance of PHC actions and services, triggered by the lack of essential structural investments for user access, the failure of the link between user-professional-service, and the effective coordination of actions that could contribute to the reduction of care and conditions related to PCSCs.²⁵

However, it can be said that the results obtained in this study, where a relative decrease in PCSCs is verified, can be attributed to various strategies to combat the COVID-19 pandemic in terms of PHC, mentioned in studies that address this theme in different municipalities. This includes online care and telecare, monitoring and tracking of suspected cases; and the testing of suspected cases, which until then was only done in hospitals and specific centers.^{26, 27} There is also the training of the health team to act in the fight against the pandemic, in addition to integrated actions between health surveillance and the implementation of effective strategies, such as strengthening communication and effective coordination between governmental and non-governmental sectors, which certainly favored consistent assistance to the pandemic and PCSCs.^{27, 23}

Arrangements like these may have had a positive impact in slowing down hospital admissions for PCSC. According to Martinazzo,² hospital admissions for PCSC are used as a tool to evaluate the ESF and its coverage, promoting continuous care. Therefore, primary care-sensitive

diseases should be constantly monitored, since the expansion of the ESF in the last 10 years, added to the resources available at this level of care, may be sufficient to treat them, without the need for hospital admission and unnecessary expenses.⁵

Regarding the costs associated with unnecessary hospital admissions because of PCSCs, these have been a problem discussed for many years, with evidence of spending on treatment of complications from chronic conditions compared to their prevention by primary care, further increasing public spending.³⁰ A recent study shows that a high proportion of PCSCs have high hospital costs, especially due to respiratory and cardiac diseases. Therefore, it is believed that spending on PCSCs should be interpreted as opportunities to reduce unnecessary health service expenses, and consequently improve resource allocation, especially in a scenario of austerity experienced by the SUS.⁵

From the perspective of ESF coverage and its impact on PCSC admissions, it is notable the reductions caused by the pandemic, in terms of ESF team members, burdened the service and hindered its work process, especially for Community Health Agents.³¹ However, a smaller scope does not mean a decrease in efficiency, a fact proven by the constant deceleration of the verified coefficients.

In other words, the advent of COVID-19 necessitated the reorganization of the workflow within PHC, by prioritizing care for respiratory symptomatic. Arrangements were made, such as prioritizing spontaneous demands to avoid crowding at health units; suspending elective care; scheduling appointments by time; and exclusively maintaining essential care.²³

However, it is valid to note that, although in decline, the decrease in hospital admissions for cardiovascular and cerebrovascular conditions, as well as respiratory diseases, was not so significant. It is believed this result is due to the work process

format, in which conditions of greater urgency may have been prioritized, delaying, in some cases, the aforementioned conditions.³²

Despite this, it can be said that the fundamental contribution of PHC to ensure the continuity of care for patients, strengthen teamwork, conduct health education for the population, ensuring the comprehensiveness of care, even in a pandemic scenario, was achieved, and this can be evidenced by the scenario of PCSC admissions.³³

While the findings serve as an important monitoring tool for primary care with valid, complete, and reliable records, there are limitations to this type of study.³⁴ Hospital admissions not linked to the SUS are not considered, and DATASUS may not detect inconsistencies in the classification of the recorded cause of admission, requiring caution in data interpretation, yet it is the official SUS data source. Multiple hospital admissions by citizens in a specific area and period may overestimate indicated values.³⁵

Therefore, it is crucial to note that the methodology used does not assess the entirety of PCSC admissions due to limitations from the SIH/SUS. However, the findings are valuable as they show that, even with the onset of the COVID-19 pandemic, PHC remains steadfast in its purpose of being effective and resolute with the resources available, minimizing the burden on other levels.

From the study's results, it is primarily necessary to mitigate the critical aspects of healthcare service coverage that affect care quality and thus require intervention. In this context, a collaboration between the Hospital das Clínicas of the Faculty of Medicine of the University of São Paulo (HCFMUSP) and the Better Health Program Brazil (BHP-B) led to the development of a Digital PHC system. In this system, doctors, through teleconsultations, support local teams at basic health units (UBS), providing telecare to communities where ESF coverage is still lacking, given that from 2008 to 2019, the monthly ESF

coverage rate showed negligible growth levels in some states, such as Amazonas, Roraima, Maranhão, and Acre.³⁶

This Digital PHC model proposes incorporating teleconsultation in UBS to expand access to medical consultations in primary care. Thus, patients, with the support of professionals like nurses and IT specialists, use a computer at the UBS to conduct a remote consultation with a doctor, considering that about 26% of the Brazilian population is digitally excluded, which coincides with those lacking PHC coverage. Moreover, patients can rely on the UBS's infrastructure, team, and established processes for care before and after the consultation.³⁶

CONCLUSION

The COVID-19 pandemic impacted hospital admissions for primary care-sensitive conditions in the state of Paraná in 2021, compared to the pre-pandemic years of 2018, 2019, and 2020, leading to a reduction in most of the investigated disease groups during the period. According to the study, there was a decrease in the percentage variation across all PCSCs in Paraná, indicating satisfactory outcomes of PHC in managing PCSCs even during a pandemic scenario.

The reorientation of practices and services, guided by public policies to combat the pandemic and the development and implementation of different strategies and approaches, as well as the restructuring of the work process within the ESF teams in Paraná, was theoretically responsible for maintaining the decline in coefficients for all diagnostic groups under study.

Furthermore, the importance of strengthening PHC, especially in the current pandemic scenario, by increasing coordination capacity with the care network, minimizing structural weaknesses, investing in its expansion,

and improving care quality through the provision of adequate working conditions and valuing its workers, is emphasized.

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