Cureus
Part of SPRINGER NATURE

Open Access Original Article

Temporal Trend of Acute Flaccid Paralysis Notifications in Brazil: An Ecological Time-Series Study, 2016–2025

Review began 10/11/2026
Review ended 10/25/2026
Published 11/03/2026

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DOI: 10.7759/cureus.119077

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Abstract

Introduction: Acute flaccid paralysis (AFP) is a notifiable clinical syndrome and an important indicator of the sensitivity of poliomyelitis surveillance, since the detection of AFP cases makes it possible to identify events potentially compatible with poliovirus. In this study, a minimum operational threshold of one case per 100,000 inhabitants under 15 years of age per year was adopted as the reference parameter for interpreting notification rates.

Methods: This ecological time-series study analyzed AFP notifications in children under 15 years of age in Brazil from 2016 to 2025, based on data from the Notifiable Diseases Information System made available by Department of Informatics of the Brazilian Unified Health System (DATASUS), describing their distribution by year, region, sex, age group, race/skin color, and schooling, and assessing the temporal trend of notification rates by segmented regression in the Joinpoint program, comparing the pre-pandemic, pandemic, and post-pandemic periods.

Results: A total of 4,913 notifications were analyzed. The highest mean rate occurred in the Northeast (1.3 per 100,000) and the lowest in the Southeast (0.9), with the lowest values in 2020-2021 and a peak in 2022. In 2020 and 2021, all regions reported rates below the World Health Organization (WHO) minimum threshold. Joinpoint regression identified no joinpoint and no significant trend in any region over 2016-2025. The 0-4-year age group accounted for the highest burden, with a mean rate of 1.21 and a joinpoint in 2020. Males had a higher notification rate throughout the series (rate ratio (RR) 1.22; $p < 0.001$). Pardo (mixed-race) race/skin color predominated (52.7%), and only 30.6% of records had classified schooling.

Conclusion: AFP notifications decreased during the pandemic period, with rates below the WHO minimum threshold in all regions in 2020 and 2021, which may indicate reduced surveillance sensitivity, a hypothesis that requires further investigation. The findings reinforce the need for continuous monitoring and strengthening of AFP surveillance.

Categories: Epidemiology/Public Health
Keywords: brazil, epidemiological monitoring, health information systems, poliomyelitis, time factors

Introduction

Global immunization efforts have led to a marked reduction in the incidence of poliomyelitis in recent decades. In 1994, the Region of the Americas was certified as free of autochthonous poliovirus transmission, an achievement attributed to expanded vaccination coverage and strengthened epidemiological surveillance systems [1]. However, maintaining this status depends on the continuity of immunization and epidemiological surveillance activities, since poliovirus circulation still persists in some countries, maintaining the possibility of reintroduction of the disease into regions previously considered free of transmission [2].

In Brazil, maintaining polio elimination status depends on the combination of high vaccination coverage and sensitive surveillance systems for the detection and investigation of suspected cases. In this context, acute flaccid paralysis (AFP) surveillance is one of the main indicators recommended by the World Health Organization (WHO) to monitor possible poliovirus circulation, allowing assessment of the quality of surveillance activities and early identification of changes in the epidemiological scenario [2,3]. At the same time, maintaining high vaccination coverage remains an important strategy to prevent reintroduction of the disease and preserve polio elimination status in Brazil [4-6].

However, this pillar has been progressively undermined. Time-trend studies conducted in the country have documented a consistent decline in polio vaccination coverage over the last decade, with marked spatial

heterogeneity across municipalities and federative units and values below the recommended target in recent years [4-6]. This decline results from a combination of factors, including difficulties in accessing health services, socioeconomic inequalities, reduced perception of the severity of the disease, vaccine hesitancy, and the spread of vaccine misinformation, especially on digital media. In addition, temporal events such as the COVID-19 pandemic contributed to the interruption or reduction of immunization and epidemiological surveillance activities in several territories, aggravating the decline in vaccination coverage [7-10].

Continuous AFP surveillance is an essential component of polio eradication strategies, enabling early detection of possible poliovirus-compatible cases and supporting timely public health responses. In practice, the sensitivity of this system is monitored through an operational threshold: in areas free of poliovirus circulation, at least one case of non-polio AFP is expected to be detected per year for every 100,000 inhabitants under 15 years of age. Rates below this level indicate that the absence of confirmed polio cases may reflect insufficient surveillance rather than a true absence of viral circulation [3]. Analysis of the epidemiological distribution of notifications and their temporal trend helps identify notification patterns, monitor the sensitivity of the surveillance system, and provide evidence for planning and strengthening public health actions.

In this context, the present study aimed to analyze the temporal trend and distribution of AFP notifications in children under 15 years of age in Brazil, from 2016 to 2025, by region, sex, age group, race/skin color, and schooling, comparing descriptively the pre-pandemic, pandemic, and post-pandemic periods, and comparing the observed rates with the minimum operational threshold recommended by the WHO.

Materials And Methods

This is an ecological time-series study with a quantitative approach, based on publicly available secondary data on AFP notifications in Brazil from 2016 to 2025. The ecological design was used to describe the distribution of notifications in the population and to analyze variation in rates over time and across population strata, without investigating individual associations or establishing causal relationships. The study was designed and reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) recommendations for observational studies [11].

Data were obtained from the Notifiable Diseases Information System (Sistema de Informação de Agravos de Notificação (SINAN)), made available by the Department of Informatics of the Brazilian Unified Health System (DATASUS) through TABNET, the online tabulation application maintained by DATASUS [12]. Data were extracted on July 27, 2026, from the database “Acute Flaccid Paralysis - Notifications registered in the Notifiable Diseases Information System”, within the group “Notifiable Diseases and Conditions - 2007 onwards (SINAN)”, selecting the 2016 to 2025 files and, as the time variable, the year of symptom onset, restricted to 2016-2025. Records in the age groups under 1 year, 1-4, 5-9, and 10-14 years were included. Records were identified through the notifiable condition “Acute Flaccid Paralysis/Poliomyelitis”, identified in SINAN by International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10) code A80.9. This code corresponds to the notifiable condition printed on the notification/investigation form, not to the final diagnosis of the case. According to the Brazilian Ministry of Health case definition, every case of sudden-onset flaccid motor deficit in individuals under 15 years of age must be notified, regardless of the diagnostic hypothesis of poliomyelitis [13]. Thus, the records analyzed correspond to notified suspected AFP cases, including those subsequently discarded as polio, which approximates the numerator of the non-polio AFP rate indicator recommended by the WHO [3]. AFP cases that were not notified under this condition are not captured by this criterion. To verify reproducibility, the query was repeated on October 25, 2026, with the same filters and reproduced the annual distribution of records, with a maximum difference of one record per year due to database updates; the distribution by final case classification was obtained from this query.

A total of 4,913 records were identified. One record with region of residence unknown or abroad was excluded only from the regional analyses, resulting in 4,912 records in those analyses. Unknown, blank, or inconsistent information for the other variables was treated as missing in the respective analyses, without automatic exclusion of the record from the other stages of the study. Data for 2025 were considered preliminary, as they are subject to updates resulting from data processing and consolidation in the system.

The variables analyzed were year, region of residence (North, Northeast, Central-West, Southeast, and South), sex (male and female), age group (0-4, 5-9, and 10-14 years), race/skin color (White, Black, Asian (Amarela), mixed-race (Pardo), and Indigenous), and schooling. First, a descriptive analysis of notifications was performed using absolute and relative frequencies to characterize their temporal, geographic, and sociodemographic distribution. For race/skin color and schooling, the analysis was restricted to frequencies and proportions, since population denominators stratified with the granularity required to calculate specific rates were not available. Accordingly, the results for these variables were interpreted as a description of the composition of the records and not as estimates of risk across population groups. The annual proportions of the Pardo and White categories were additionally analyzed by Joinpoint regression, with the same specifications described below; proportions were calculated relative to the annual total of notifications, including in the denominator records with unknown or blank race/skin color, whose annual proportion was also analyzed. For schooling, the categories “Not applicable” and “Unknown/Blank” were described

separately and excluded from the distribution by schooling level. The final case classification was described using absolute and relative frequencies.

To analyze the temporal distribution and allow comparison across regions, sexes, and age groups, annual notification rates per 100,000 inhabitants were calculated. For the analyses by region and sex, population projections for individuals under 15 years of age were used; for the analyses by age group, projections for the respective age group were used. Denominators were obtained from the Brazilian Institute of Geography and Statistics (IBGE) [14]. The use of rates, rather than isolated absolute frequencies, allowed differences in the size of the reference populations to be taken into account. Annual and regional rates were compared descriptively with the minimum operational threshold recommended by the WHO of at least one AFP case per 100,000 inhabitants under 15 years of age per year in areas without endemic poliovirus circulation [3]. This comparison was used as a reference for interpreting notification rates and was not considered a direct measurement or validation of the actual sensitivity of the surveillance system.

The temporal trend of notification rates was assessed by segmented regression using the Joinpoint Regression Program, version 6.0.1 (National Cancer Institute, USA) [15]. A log-linear model was used, allowing the identification of at most one joinpoint (a limit compatible with series of ten annual observations), to investigate whether the trajectory of rates showed a statistically significant change over the series. Joinpoint selection was based on the Monte Carlo permutation test, with 4,499 permutations and a significance level of 5% ($p < 0.05$). The annual percent change (APC) and the average annual percent change (AAPC) were estimated, with their respective 95% confidence intervals (CIs). The APC expresses the estimated annual percent change in each model segment, whereas the AAPC summarizes the average annual percent change over the period considered. Trends were classified as increasing or decreasing when statistically significant, considering $p < 0.05$ and consistency with the 95% CI; otherwise, they were classified as stable. When no significant joinpoint was identified, the series was represented by a single segment from 2016 to 2025, and the APC equaled the AAPC. As a sensitivity analysis, the regressions by region and by sex were repeated excluding 2025, whose data are preliminary.

Complementing the trend analysis, rates were described according to three periods defined a priori: pre-pandemic (2016-2019), pandemic (2020-2021), and post-pandemic (2022-2025). The delimitation considered the complete calendar years of greatest restriction of routine health service activities during the Public Health Emergency of National Importance (Emergência em Saúde Pública de Importância Nacional (ESPIN)) due to COVID-19, declared in February 2020 and ended in April 2022 [16,17], and the availability of four complete years before and after this interval. This stratification was descriptive, to contextualize variations in notifications in relation to the COVID-19 pandemic period. Mean rates and the variations observed between periods were presented, without treating this comparison as a trend estimate produced by the Joinpoint model or as evidence of a causal effect of the pandemic.

The comparison between male and female notification rates was based on annual rates. For each year, the ratio between the male and the female rate was calculated; the rate ratio (RR) for the period corresponded to the arithmetic mean of the 10 annual ratios, with the 95% CI obtained from Student's t distribution (9 degrees of freedom). The difference between the annual rates of the two sexes was assessed using a paired t-test. Because it was based on only ten aggregated annual observations, this comparison was considered exploratory.

As the study used exclusively public-domain secondary data without individual identification, it was conducted in accordance with the applicable ethical provisions for research, as set out in Resolution No. 510 of April 7, 2016, of the Brazilian National Health Council [18].

Results

A total of 4,913 AFP notifications in individuals under 15 years of age were recorded in Brazil from 2016 to 2025, of which 4,912 had information on region of residence. Regarding final classification, 92.1% of records were discarded as polio, 4.6% had unknown or blank classification, 2.3% were inconclusive, and 0.4% were compatible. 27 records (0.5%) were classified as vaccine-associated poliomyelitis (n = 21), vaccine-derived poliovirus (n = 4), or wild poliovirus (n = 2), never exceeding 1.4% of notifications in any year. The highest mean notification rate in the period was observed in the Northeast (1.34), and the lowest in the Southeast (0.92). The mean of the regional rates was 1.18 in the pre-pandemic period (2016-2019), decreased to 0.64 in the pandemic period (2020-2021), and returned to 1.30 in the post-pandemic period (2022-2025). As shown in Figure *1*, in 2020 and 2021, all five regions had rates below the minimum operational threshold recommended by the WHO for AFP surveillance, of one case per 100,000 inhabitants under 15 years of age. In the pre-pandemic period, the Southeast (0.90) and the Central-West (0.99) already had mean rates below this threshold. After remaining above it from 2022 to 2024, the Southeast fell below it again in 2025 (0.86). Between 2020 and 2021, rates increased in four regions and decreased in the Central-West. Joinpoint regression identified no significant joinpoint in any region, and each regional series was described by a single segment, with no statistically significant trend over the period (Table *1*). In the sensitivity analysis excluding 2025, no region showed a joinpoint or a significant trend (AAPC 2016-2024: North +1.73%, $p = 0.679$; Northeast −1.12%, $p = 0.787$; Southeast +3.23%, $p = 0.551$; South −1.51%, $p = 0.788$; Central-West +2.24%, $p = 0.710$).

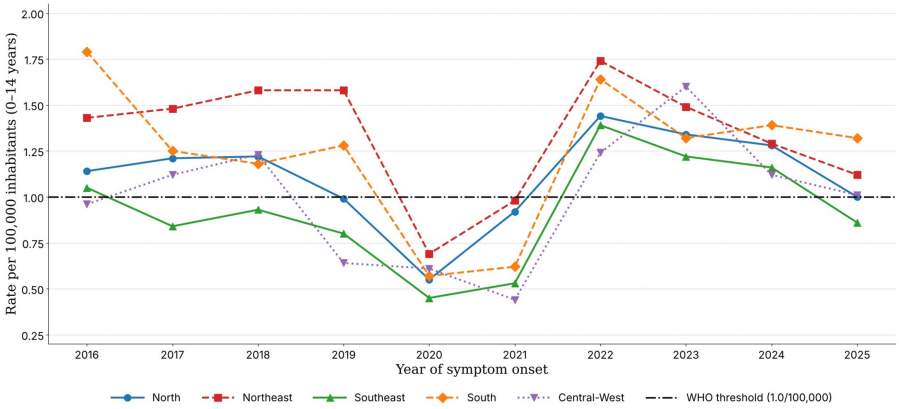


FIGURE 1: Notification rate of AFP by region of Brazil, 2016–2025

Source: Prepared by the authors using data from the SINAN and population projections from the IBGE, 2016–2025.

AFP: Acute flaccid paralysis; SINAN: Notifiable Diseases Information System; IBGE: Brazilian Institute of Geography and Statistics

Region	Period	AAPC (%)	95% CI		p-value	Interpretation	Change 2020–2021 (%)[1]
			Lower	Upper			
North	2016–2025	0.8	−6.38	8.54	0.809	Stable	67.27
Northeast	2016–2025	−1.69	−8.73	5.89	0.611	Stable	42.03
Southeast	2016–2025	2.23	−6.97	12.34	0.604	Stable	17.78
South	2016–2025	−0.37	−10.01	10.3	0.935	Stable	8.77
Central-West	2016–2025	2.1	−8.10	13.43	0.661	Stable	−27.87

TABLE 1: Temporal trends in notification rates of AFP in children under 15 years of age, by region, Brazil, 2016–2025

Source: SINAN/DATASUS, 2016–2025

Method: Joinpoint regression on the natural logarithm of the rates, allowing a maximum of one joinpoint, with model selection by Monte Carlo permutation test (α = 0.05). No region showed a significant joinpoint (permutation p-values: North 0.381; Northeast 0.610; Southeast 0.252; South 0.091; Central-West 0.264); the final model therefore comprised a single segment, so that APC = AAPC.

Trends were classified as increasing or decreasing when $p < 0.05$ and as stable otherwise.

1 observed percent change between the 2020 and 2021 rates (descriptive; not a trend estimate).

AFP: Acute flaccid paralysis; SINAN: Brazilian Notifiable Diseases Information System; DATASUS: Department of Informatics of the Brazilian Unified Health System; AAPC: Average annual percent change; APC: Annual percent change; CI: Confidence interval

AFP rates were stratified into three pediatric age groups: 0-4, 5-9, and 10-14 years. The 0-4-year group accounted for the highest burden in the period, with a mean rate of 1.21. The 5-9 and 10-14-year groups had mean rates of 1.03 and 1.00, respectively, showing a decreasing gradient of notification rates with increasing age, as shown in Figure *2*. Joinpoint regression identified a joinpoint in 2020 only in the 0-4-year group, with a significant decline in the 2016-2020 segment (APC = −21.11%/year; 95% CI: −33.02% to −7.09%; p = 0.011), followed by a non-significant recovery in the 2020-2025 segment (APC = +12.50%/year; 95% CI: −1.05% to +27.92%; p = 0.067). In the 5-9 and 10-14-year groups, no joinpoint was identified, with a stable, non-significant annual trend throughout the series (5-9 years: APC = +0.91%/year; 95% CI: −7.12% to +9.64%; p = 0.807; 10-14 years: APC = +2.47%/year; 95% CI: −4.34% to +9.77%; p = 0.437).

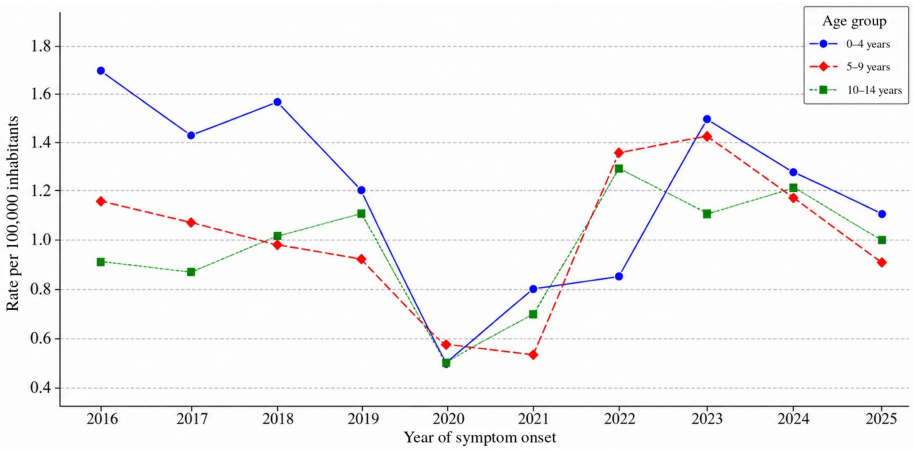


FIGURE 2: Notification rate of AFP (per 100,000 inhabitants) by age group (0–4, 5–9, and 10–14 years), Brazil, 2016–2025

Source: Prepared by the authors using data from the SINAN and population projections from the IBGE, 2016–2025.

AFP: Acute flaccid paralysis; SINAN: Notifiable Diseases Information System; IBGE: Brazilian Institute of Geography and Statistics

The mean AFP notification rate was 1.21 among males and 1.01 among females. Notifications predominated in the male group throughout the period, with rates ranging from 0.66 to 1.68, while in females they ranged from 0.46 to 1.35 (Table *2*). The mean RR was 1.22 (95% CI: 1.12 to 1.31), with the interval entirely above 1.0, indicating a consistently higher notification rate among males over the period, although inferences are limited by the small number of observations (n = 10) (paired t-test: t = 5.88; p < 0.001). In the pre-pandemic period (2016-2019), mean rates were 1.30 and 1.05 for males and females, respectively. In 2020-2021, both sexes showed marked reductions (−47.0% and −44.6%), with a proportional recovery from 2022 (+100.7% and +103.0% relative to the pandemic period), with post-pandemic mean rates 6.3% and 12.4% higher than those of the pre-pandemic period.

Year	Male Notifications	Female Notifications	Total	Male Rate*	Female Rate*
2016	311	257	568	1.35	1.17
2017	304	208	512	1.33	0.95
2018	305	232	537	1.34	1.07
2019	270	217	487	1.19	1
2020	148	100	248	0.66	0.46
2021	162	150	312	0.72	0.7
2022	377	290	667	1.68	1.35
2023	332	263	595	1.48	1.23
2024	283	258	541	1.26	1.21
2025	250	196	446	1.12	0.92
Total	2,742	2,171	4,913	—	—
Mean	—	—	—	1.21	1.01

TABLE 2: Notifications of AFP in children under 15 years of age, by sex and year, Brazil, 2016–2025

* Notification rate per 100,000 inhabitants (population aged 0–14 years, IBGE)

Source: SINAN/DATASUS, Brazilian Ministry of Health

AFP: Acute flaccid paralysis; IBGE: Brazilian Institute of Geography and Statistics; SINAN: Brazilian Notifiable Diseases Information System; DATASUS: Department of Informatics of the Brazilian Unified Health System

In the Joinpoint trend analysis, using the same specifications adopted for the regions, the permutation test identified no significant joinpoint for either sex (p = 0.284 for males and p = 0.302 for females). Thus, each series was described by a single segment, with no statistically significant trend over 2016-2025 (males: AAPC = −0.27%; 95% CI: −8.02% to +8.14%; p = 0.941; females: AAPC = +0.94%; 95% CI: −7.38% to +10.01%; p = 0.808). The result was maintained in the sensitivity analysis excluding 2025 (males: AAPC = −0.01%; p = 0.998; females: AAPC = +1.71%; p = 0.726).

Regarding self-reported race/skin color, shown in Figure *3*, most cases were classified as Pardo (52.7%), followed by White (33.5%), unknown/blank (8.6%), Black (4.0%), Indigenous (0.7%), and Amarela (0.5%). Throughout the period, the proportion of Pardo cases remained predominant in every year, ranging from 46.5% (2016) to 58.1% (2025). Records classified as unknown/blank (n = 423; 8.6% of the total) were kept in the denominator of the annual proportions, and their proportion ranged from 12.1% (2016) to 4.0% (2025). Joinpoint analysis identified no significant joinpoint in the annual proportions of Pardo (permutation p = 0.851) and White (p = 0.922) cases. Thus, each series was described by a single segment. The proportion of Pardo cases showed an increasing trend (APC = +1.89%/year; 95% CI: +0.62% to +3.18%; p = 0.009), whereas that of White cases remained stable (APC = −0.99%/year; 95% CI: −2.83% to +0.88%; p = 0.255). The proportion of records with unknown race/skin color showed no significant trend (APC = −5.92%/year; 95% CI: −12.60% to +1.27%; p = 0.092).

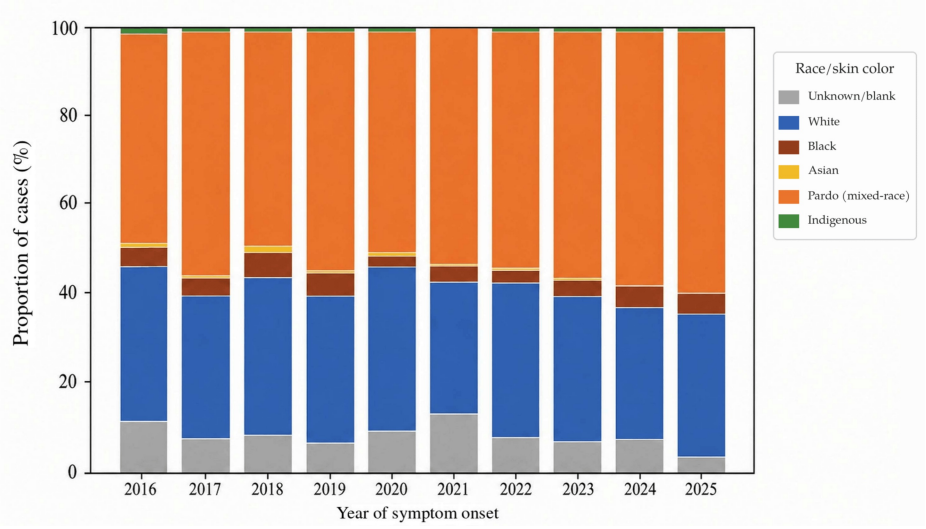


FIGURE 3: Proportional distribution of AFP notifications in children aged 0–14 years by self-reported race/skin color, Brazil, 2016–2025

Source: SINAN data, made available by DATASUS

AFP: Acute flaccid paralysis; SINAN: Notifiable Diseases Information System; DATASUS: Department of Informatics of the Brazilian Unified Health System

These results describe the racial composition of notified cases and do not allow inferences about differential risk between groups, since population denominators stratified by race/skin color and age group are not available with annual granularity. The observed variation may reflect changes in data completeness, differences in the demographic composition of the population, or real changes in the distribution of cases, and these mechanisms cannot be distinguished with the available data.

The schooling variable showed a relevant information limitation: 51.0% of records were classified as "Not applicable", a category assigned to all children under 5 years of age and to some children aged 5-9 years, while 18.4% were recorded as Unknown or Blank, totaling 69.4% of records without determinable schooling. Only 30.6% of cases (n = 1,505) allowed analysis by schooling level. Among cases with determinable schooling, records with incomplete 5th-8th grade of elementary school (40.1%) and incomplete 1st-4th grade of elementary school (37.7%) predominated, together accounting for 77.8% of classified cases. The absence of a population denominator stratified by schooling made it impossible to calculate rates by educational level, restricting the analysis of this variable to proportional distributions.

Discussion

The present study identified a sharp drop in AFP notifications in 2020, with recovery starting in 2021 and a peak in 2022 in most Brazilian regions, and the highest mean notification rate in the Northeast region over the period. A previous study on the epidemiology of AFP in Brazil between 2014 and 2018 also found a predominance in the Northeast and Southeast regions [19], reaffirming the consistency of this regional pattern. As a national analysis based on surveillance data, the findings are directly applicable to the Brazilian context and allow comparisons across regions and periods. However, generalization to other countries or surveillance systems should be made with caution, considering differences in the organization, coverage, and sensitivity of information systems.

The drop in 2020 followed by recovery, temporally associated with the COVID-19 pandemic, is consistent with international reports, which documented a 33% reduction in AFP cases reported globally between January and September 2020 compared with the same period in 2019, attributed to the disruption of epidemiological surveillance during the acute phase of the COVID-19 pandemic [9], with a gradual recovery of surveillance capacity documented as early as 2021 [10]. AFP surveillance is a central operational indicator for maintaining polio-free status [20].

The finding of greatest operational relevance, however, is the position of the observed rates relative to the minimum threshold recommended by the World Health Organization. In 2020 and 2021, all five Brazilian regions reported fewer than one AFP case per 100,000 inhabitants under 15 years of age, a level below which the absence of confirmed polio cases cannot be safely interpreted as an absence of viral circulation [3]. Considering the whole series, the mean regional rates remained close to the threshold, ranging from 0.9 in the Southeast to 1.3 in the Northeast, with no comfortable margin relative to the expected minimum. This

result suggests that the observed rates should be read primarily as an indicator of notification. The variations may reflect changes in true incidence, case definition, or notification practices, which this design cannot distinguish; thus, reduced surveillance sensitivity is a plausible hypothesis but was not tested in this study.

The greater burden of notifications in the 0-4-year group, with a decreasing gradient in the subsequent age groups, is consistent with a 10-year Brazilian study that identified a predominant concentration of AFP cases in children aged 1-4 years in Brazil between 2012 and 2021 [21]. The persistence of this pattern across different time frames suggests that the greater concentration of notifications in early childhood is a relatively stable feature of the AFP notification profile in the country.

The fact that the highest notification rate occurred among males throughout the period corroborates the same 10-year study, which described a predominance of 55.67% of AFP cases among males in Brazil [21]. The persistence of this pattern across different periods suggests that it is a stable feature of the epidemiological profile of AFP in the country rather than a particularity of the time frame of this study.

The WHO threshold is used as a reference level to assess case-detection capacity; since there was no autochthonous wild poliovirus circulation in the country during the period, the overall AFP rate is an operational indicator used to monitor the sensitivity of epidemiological surveillance [3]. The predominance of notifications among individuals self-reported as Pardo, with an increasing trend in this proportion throughout the series (APC = +1.89% per year), should be interpreted with caution. This increase may reflect, at least partially, improved completeness of the race/skin color field over time (the proportion of unknown records fell from 12.1% in 2016 to 4.0% in 2025, although without a statistically significant trend), and not necessarily a real change in the epidemiological profile of cases.

Studies on the completeness of this variable in health records in Brazil have identified progressive improvement over the last decade, with missing data falling from about one third to just over one fifth of records between 2010 and 2020 [22], a pattern also described in other national health information systems [23]. This competing possibility can be neither confirmed nor ruled out with the data from this study.

The low proportion of records with classified schooling, with a high frequency of unknown fields, is consistent with the weak completeness already described for non-mandatory variables in SINAN for other compulsorily notifiable conditions, whose completion tends to be lower than that of mandatory fields [24]. The low completeness of socioeconomic variables is a structural limitation of the notification system and is not exclusive to AFP surveillance.

This study has the limitations inherent to the ecological time-series design, which precludes establishing causal relationships at the individual level, and information bias resulting from incomplete and inconsistent sociodemographic variables. The data source consists of passive notification to SINAN, subject to underreporting and to variations in surveillance sensitivity across regions and periods, so the results describe the behavior of notifications and not necessarily the true incidence of the condition. The comparison between the pre-pandemic, pandemic, and post-pandemic periods is descriptive, without a counterfactual or interrupted time-series model; therefore, the observed variations should be interpreted as temporally associated with the COVID-19 pandemic and not as a causal effect. Furthermore, vaccination coverage was not analyzed together with notifications, so the study does not allow estimation of the risk of reintroduction or occurrence of poliomyelitis. Selecting records through the ICD-10 A80.9 condition captures only cases notified as AFP in SINAN, so unnotified cases are not included. In addition, the numerator includes 27 records (0.5%) classified in SINAN as vaccine-associated poliomyelitis, vaccine-derived poliovirus, or wild poliovirus; the latter (n = 2) probably reflect classification or data-entry errors, since the last case of wild poliovirus poliomyelitis in the country occurred in 1989, and the inclusion of these records does not materially change the rates. No external validation of the case definition was performed, the sensitivity analysis was limited to excluding the preliminary 2025 data, and each series contains only 10 annual observations, which reduces the statistical power of the Joinpoint regression and makes the comparison between sexes using the paired t-test exploratory. To reduce possible biases arising from data processing, the same extraction strategy was used for all years analyzed, with missing information handled separately for each variable. Because the data were tabulated in aggregate form in TABNET, it was not possible to check for duplicates at the individual level.

Data for 2025 should be considered preliminary, since they are subject to data-entry delays and later case closure in the system, which may underestimate the rates for the last year of the series; in the verification query, there were 13 additional notifications with symptom onset in 2025 recorded in the 2026 file, which were not included because only the 2016-2025 files were selected. Nevertheless, excluding this year in the sensitivity analysis did not change the classification of trends by region or sex. Finally, the lack of data on laboratory confirmation and final etiological diagnosis prevents distinguishing among the different conditions that make up the AFP syndrome (poliomyelitis, Guillain-Barré syndrome, transverse myelitis, among others), limiting the etiological interpretation of the patterns described.

Conclusions

This study described the temporal trend and distribution of AFP notifications in children under 15 years of age in Brazil over a decade. Notification rates remained close to the minimum operational threshold recommended by the WHO and fell below it in all regions during 2020-2021, with no statistically significant average change over the full period in any region. Together with the low completeness of SINAN sociodemographic variables, these findings indicate that the observed stability in notifications should be interpreted considering possible limitations in detection capacity and record completeness, and they do not allow direct inferences about the actual occurrence of AFP. The findings reinforce the need to maintain surveillance sensitivity and improve record completeness, especially after the period of reduced notifications associated with the COVID-19 pandemic.

Despite the limitations inherent to the ecological design and the use of secondary data, which preclude inferences about individual risk, the findings are relevant at the population level and point to concrete operational priorities: recovering AFP notification rates above the minimum threshold in all regions and improving the completeness of SINAN sociodemographic fields. Future studies should incorporate the other AFP surveillance quality indicators, such as timeliness of investigation and adequacy of stool specimen collection, as well as individual clinical and socioeconomic variables, in order to distinguish more precisely between the limitations of the surveillance system and real changes in the epidemiological profile of the condition.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

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Disclosures

Human subjects: All authors have confirmed that this study did not involve human participants or tissue. **Animal subjects:** All authors have confirmed that this study did not involve animal subjects or tissue. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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