

# ANALYSIS OF CHILDHOOD MEASLES VACCINE COVERAGE IN THE MIDWEST REGION UNDER THE INFLUENCE OF THE PANDEMIC AND ANTI-VACCINE MOVEMENTS

Helena Diniz Matos<sup>1</sup>  
Rodrigo Augusto Mastrella Curado Fleury<sup>2</sup>  
Vitor Dayrell Ramos Pereira<sup>3</sup>  
Thalysson Souza Rangel<sup>4</sup>  
Karla Cristina Naves Carvalho<sup>5</sup>  
Evangelical University of Goiás – UniEVANGÉLICA<sup>1,2,3,4,5</sup>

## ABSTRACT

Measles is an infectious disease caused by the Measles morbillivirus virus, and vaccination is the main form of prevention. Vaccination is a crucial strategy for preventing disease and has been designated one of the greatest public health achievements of the 20th century. With the success of the National Immunization Program (PNI) in preventing the transmission of measles, in 2016, Brazil received certification from the World Health Organization (WHO) for eliminating the circulation of the virus. However, due to a migration crisis in 2018 in the north of the country, it ended up losing this certification. This study aims to identify the prevalence of measles vaccination coverage in the Midwest in children up to 2 years of age and analyze the impact of the pandemic and anti-vaccine movements in the period before and after the pandemic. This is a retrospective quantitative study, in which the data used were collected from DATASUS, corresponding to the years 2018 to 2021. Since this platform is in the public domain, no submission to the Ethics and Research Committee was required. Thus, a reduction in measles vaccination rates was observed in the Midwest region, with an emphasis on the state of Mato Grosso do Sul, especially in the years 2020 to 2021, presenting a relationship with the COVID-19 pandemic and anti-vaccination movements. Therefore, there is a clear need for greater promotion of vaccination campaigns and strategies to prevent the spread of fake news that discourages such an essential practice as vaccination.

**Keywords:** Measles; Vaccines; Pandemic.

## INTRODUCTION

Vaccination is a strategy that prevents countless deaths worldwide. In Brazil, vaccination campaigns combat, control, and even eradicate preventable diseases. In this sense, the National Immunization Program (PNI) was established, which plays an important role in the distribution and expansion of vaccination by allowing access to immunizers for the entire population, especially children (PROCIANOY *et al.*, 2022).

The decline in vaccination coverage among children was potentially exacerbated, mainly due to the concern of caregivers about contamination and the isolation and social distancing measures adopted during the pandemic

(BRAMER *et al.*, 2020). Therefore, it is essential to emphasize that this reduction, especially among children, is due to multiple factors (SILVA *et al.*, 2023). In this scenario, measles, a contagious disease capable of causing pneumonia, encephalitis, and even death, which can be prevented through vaccination, ends up finding space in the social environment due to negligence with immunization (CARVALHO *et al.*, 2019).

In Brazil, in 2001, there was no autochthonous transmission (which originates in the region where it is found) of the measles virus. In this sense, with the success of the PNI in preventing the transmission of measles, in 2016 Brazil received certification from the World Health Organization (WHO) for eliminating the circulation of the virus. However, in 2018, an outbreak occurred in the north of the country, highlighting the importance of remaining vigilant in controlling this disease (MORAES *et al.*, 2019).

Thus, this study highlights the importance of raising awareness among individuals about the relevance of measles immunization, which has seen declines in vaccination coverage rates, and alerts them to the crucial importance of the vaccination strategy, with the aim of analyzing childhood vaccination coverage in the Midwest region under the influence of the pandemic and anti-vaccination movements from 2018 to 2021, in order to develop more effective public policies.

## **METHODOLOGY**

This is a retrospective quantitative study synthesized from the collection and analysis of data on childhood vaccination coverage in the Midwest region between 2018 and 2021 for measles vaccines (triple and tetra viral), which were collected through the Department of Information Technology of the Unified Health System (DataSUS). The data of interest for the study were archived and analyzed in a Microsoft Office Excel 2019 spreadsheet using descriptive statistics. In addition, the data analysis was supported by theoretical input provided through bibliographic research, prioritizing publications from the last 10 years in the Virtual Health Library (BVS), Google Scholar, Scientific Electronic Library Online (SciELO), and Pubmed, using the Health Sciences Descriptors (DeCS) “measles,” “vaccines,” and “pandemic.” Since the

DataSUS information is in the public domain, this study was not submitted to the Research and Ethics Committee (CEP).

## RESULTS

The vaccination coverage found in the Midwest region between 2018 and 2021 was 85.58% for the Triple Viral D1 vaccine, 70.52% for the Triple Viral D2 vaccine, and 51.87% for the Tetra Viral (SRC+VZ) vaccine. Tables 1 and 2 below present the data corresponding to each year emphasized by the study.

**Table 1** – Doses of triple and tetra viral vaccines administered between 2018 and 2021 in the Midwest.

Vaccine - dose	2018(n)	2019(n)	2020	2021
Triple viral (D1 and D2) and Tetra viral	8,352,983	8,181,335	8,505,906	7,059,482

**Source:** [National Immunization Program Information System \(SI-PNI/CGPNI/DEIDT/SVS/MS\)](#), 2024.

**Table 2** – Triple and Tetra viral vaccination coverage between 2018 and 2021 in the Midwest region.

Vaccine - dose	2018	2019	2020	2021
Triple – D1	91.00	91	79.91	80.25
Triple – D2	83.06	84.22	68.83	46.1
MMR	67.39	77.47	53.70	5

**Source:** [National Immunization Program Information System \(SI-PNI/CGPNI/DEIDT/SVS/MS\)](#), 2024.

As for the states in the Central-West Region and the Federal District, it is noted that all showed a considerable reduction in triple and quadruple viral vaccination in 2020 and 2021. In Goiás, the reduction in doses administered was 6.12%, in Mato Grosso 4.13%, in the Federal District 3.71%, and in Mato Grosso do Sul 18.22%. In this scenario, the most significant decrease occurred in Mato Grosso do Sul when comparing the two years prior to the pandemic with the post-pandemic period. Tables 3 and 4 detail the values that enabled the comparison of doses administered in the years covered by the study.

**Table 3 – Doses of triple and tetra viral vaccines administered between 2018-2019 and 2020-2021 in the states of the Midwest.**

Regions/Unit (State)	of Federation	2018-2019	2020-2021
Mato Grosso		1,109,944	907,709
Mato Grosso		1,283,063	1,230,094
Goiás		2,121,136	1,991,340
Federal District		962,860	927,192

**Source:** [National Immunization Program Information System \(SI-PNI/CGPNI/DEIDT/SVS/MS\)](#), 2024.

**Table 4 - Doses of triple and tetra viral vaccines administered between 2018 and 2021 in the states of the Midwest.**

Mato Grosso do Sul  
Mato Grosso  
Goiás  
Federal District

**Source:** [National Immunization Program Information System \(SI-PNI/CGPNI/DEIDT/SVS/MS\)](#), 2024.

In this sense, it is important to consider vaccination in all regions of the country in order to compare them, with the aim of identifying possible increases, reductions, or stability in these data. It is observed that in all regions, in the two years prior to the pandemic, there were more immunizations than in the periods of 2020 and 2021. It is worth noting that the Central-West Region has the lowest immunization rates for measles in children up to 2 years of age and showed a percentage drop of 65.5%, a very significant figure in relation to the immunization strategy. The numerical data are shown in Table 5.

**Table 5 - Doses of triple and tetra viral vaccines administered in Brazilian regions up to the age of 2 years.**

Region	2018	2
<b>1 North</b>	3,676,019	792,977
<b>2 Northeast Region</b>	7,119,775	2,191,315
<b>3 Southeast Region</b>	14,437,379	3,495,624
<b>4 Southern Region</b>	4,589,272	1,299,216
<b>5 Central-West Region</b>	2,110,268	725,991

**Source:** [National Immunization Program Information System \(SI-PNI/CGPNI/DEIDT/SVS/MS\)](#), 2024.

The lowest vaccination coverage rates were observed during 2020 and 2021 for the first and second doses of the MMR vaccine in the North region, while the lowest coverage rate for the DTaP vaccine was found in the Southeast region.

## **CONCLUSION**

In summary, although there are limitations within the research conducted by DATASUS and the secondary literature used, it can be concluded that there was a reduction in vaccination coverage and doses administered of triple and tetra viral vaccines between 2018 and 2021 in the Midwest region and in other regions of the country. The reduction was most notable between 2020 and 2021, thus showing a relationship with the pandemic and also with anti-vaccine movements. The largest decrease observed from 2018 to 2021 in the 2-year age group among Brazilian regions in terms of doses administered was in the Midwest, with the state of Mato Grosso do Sul showing the largest reduction. In this scenario, it is essential to disseminate adequate information about the importance of vaccination and to combat anti-vaccination movements and false information spread about vaccines.

## **BIBLIOGRAPHICAL REFERENCES**

BRAMER C.A., *et al.* Decline in Child vaccination coverage during the COVID-19 Pandemic – Michigan Care Improvement Registry. May 2016-May 2020. **Morbidity and Mortality Weekly Report**, v.69, n.20, p.630-631, 2020.

CARVALHO A.L., *et al.* MEASLES: UPDATES AND RE-EMERGENCE, Revista Medicina Minas Gerais, v.29, n.13, p.80-85, 2019.

MORAES M. M., *et al.* Serological epidemiological study of measles in populations residing in the Metropolitan Region of Belém, state of Pará, Brazil, 2016 to 2018. **Pan-Amazonian Health Journal**, v. 11, n. 1 p. 1-11, 2019.

PROCIANOY, G.S. *et al.* Impact of the COVID-19 pandemic on vaccination of children up to one year of age: an ecological study. **Science, health and the community**, no. 3, v. 27, p. 969-978, 2022.

SILVA, F.S.R. *et al.* ANALYSIS OF MEASLES INCIDENCE BY GEOGRAPHIC REGION OF BRAZIL FROM 2020 TO 2022. **Journal of Human Growth and Development**, v.1, p.99-114,2023.