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Restoring High Vaccine Coverage in Brazil: Successes and Challenges

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Title: Restoring High Vaccine Coverage in Brazil: Successes and Challenges

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Conflict of interest: The authors declare that they work at the Brazilian Ministry of Health

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Abstract:

Facing the decline in vaccine coverage observed since 2016, the new Brazilian government committed to reversing this scenario. To achieve this, the Federal Government launched the National Vaccination Movement and the 'Health with Science' platform to combat vaccine misinformation, promoted Microplanning, providing tools for decision-making at the territorial level, allocated 30 million dollars to states and municipalities to implement innovative vaccination strategies, standardized the rules of the information systems for the registration of vaccine doses, and directed data to the National Health Data Network (RNDS). Reversing the declining trend of vaccination coverage in Brazil is challenging, but within just one year, it is possible to observe significant results from governmental actions. Out of the eight recommended vaccines by the age of one, seven showed an increase in vaccination coverage in 2023 compared to 2022: Most states showed improvements in vaccination coverage. Many challenges persist in advancing the vaccination agenda. However, there are reasons to celebrate the reversal of the declining trend in coverage of several vaccines in this first year of government and the increase in the number of municipalities that have fully achieved the vaccination coverage target. The National Vaccination Movement, with public opinion awareness, the resumption of regionalized communication campaigns, localized micro-planning actions including extramural vaccination strategies, and the integration of information systems, has been decisive in strengthening work in the territories and thus restoring a culture of immunization, a source of pride in the country and internationally recognized, throughout the 50 years of the National Immunization Program.

Keywords: Vaccines, Vaccination, Vaccination coverage, Immunization programs, Brazil

Text:

Facing the decline in vaccine coverage observed since 2016, the government under President Lula committed to reversing this scenario, prioritizing the resurgence of high vaccine coverage in Brazil. To achieve this, the Federal Government launched the National Vaccination Movement (*Movimento Nacional Pela Vacinação*) in early 2023 and directed all technical and communication actions of the Ministry of Health to promote population vaccination with the slogan 'vaccine is life, vaccine is for everyone.' Alongside the National Vaccination Movement , the government: (1) launched the 'Health with Science' platform to monitor and combat vaccine misinformation, (2) promoted Microplanning, providing tools for decision-making at the territorial level and allocating 151 million reais (around 30 million dollars) to states and municipalities to implement innovative vaccination strategies, and (3) standardized the rules of the information systems for the registration of vaccine doses and directed all data to the National Health Data Network (*Rede Nacional de Dados em Saúde* - RNDS).

Reversing the declining trend of vaccination coverage in Brazil is a challenge, but within just one year, it is possible to observe significant results from government actions. Our initiatives were accompanied by efforts from the Legislative branch through creating the National Front for Vaccination (*Frente Nacional pela Vacinação*), the National Council of Prosecution Services (CNMP) with the National Pact for Vaccine Awareness (*Pacto Nacional pela Consciência Vacinal*), the National Council of Municipal Health Secretariats (Conasems), the National Council of Health Secretaries (Conass), the Oswaldo Cruz Foundation (Fiocruz), the states, municipalities, scientific associations, and organized civil society.

Out of the eight recommended vaccines by the age of one, seven showed an increase in their vaccination coverage in 2023 throughout Brazil when compared to the coverage recorded in 2022: Hepatitis A, pneumococcal, meningococcal, poliomyelitis, diphtheria-tetanus-pertussis (DTP), first dose, and second dose of the measles, mumps, and rubella vaccine. Nationally, vaccination coverage increased between 4.0% (2nd dose of measles, mumps, and rubella, from 57.6% in 2022 to 61.6% in 2023) and 7.8 percentage points (pneumococcal, from 71.5% in 2022 to 78.0% in 2023).

When evaluating vaccination coverage across states, it was observed that all of them showed improvements in coverage for the DTP vaccine. Twenty-six states increased coverage for polio and the first dose of the MMR vaccine. Twenty-four expanded coverage for hepatitis A, meningococcal, and the first dose of the MMR vaccine, while 23 states enhanced coverage for the pneumococcal vaccine.

In this scenario of reversing the declining vaccination coverage in Brazil, the state of Piauí stood out by increasing coverage for the first dose of the MMR vaccine from 73.1% to 97.8%, for polio from 75.9% to 89.0%, and for DTP from 73.1% to 92.8%. The state of Espírito Santo increased meningococcal vaccine coverage from 75.9% to 89.9%. In Rondônia, the vaccination coverage for the first dose of the MMR vaccine rose from 89.2% to 99.6%, reaching the recommended target.

The increase in vaccination coverage directly impacted the number of municipalities reaching the recommended coverage goals. Among the vaccines recommended for one-year-olds, the DTP vaccine stands out, with an additional 713 municipalities meeting the 95% vaccination coverage

goal (from 1,467 in 2022 to 2,180 municipalities in 2023), followed by the polio vaccine, with an increase of 705 municipalities meeting the goal (from 1,463 to 2,168 municipalities), and hepatitis A, with an expansion of 701 municipalities (from 1,745 to 2,446 municipalities).

The yellow fever vaccine, recommended at nine months of age, stood out among those recommended for children under one-year-old. Its coverage increased from 60.7% in 2022 to 67.3% in 2023, and all states reported increased vaccination coverage. The Federal District was one of the highlights, progressing from 71.9% in 2022 to 82.9% in 2023. Rio Grande do Norte and Sergipe states recorded absolute increases in yellow fever vaccine coverage of over 30%, reaching levels close to the target.

A significant highlight was the human papillomavirus (HPV) vaccine, which had been experiencing a decline in the number of doses administered since 2014 despite the increase in the population to which the vaccine should be administered[1,2]. In 2023, unlike previous years, there was a 30% increase in HPV vaccination. In addition to microplanning, vaccination in schools promoted by several municipalities was a fundamental strategy for this positive result in HPV vaccination.

The recovery of vaccine coverage recommended for children under six months of age represents a significant challenge. More than in other age groups, achieving high vaccine coverage in children under six months depends on primary care actions for early childhood[3,4]. The restoration of vaccine coverage in this age group is more related to primary care coverage than to the intensification of vaccination efforts[4]. When these children are not appropriately vaccinated until they reach one year, the catch-up doses are not counted towards the vaccination coverage for <1 year of age. Therefore, vaccine coverage for recommended vaccines between 2 and 6 months of life (rotavirus, meningococcal, pentavalent, pneumococcal, and poliomyelitis) remained stable when compared to the coverages of 2022.

Continuous monitoring of vaccine coverage is essential for the success of the National Immunization Program. A comprehensive, flexible, and timely vaccine information system is required for this. The restructuring of vaccine information systems was an urgent need. It was also the subject of action in 2023, with all vaccine data directed to the National Health Data Network (RNDS).

Until 2022, records of routine vaccine doses administered were consolidated from various information systems and presented on the Tabnet panel. Once within the RNDS, all doses are linked to an individual's Brazilian registry number (*Cadastro de Pessoa Física* - CPF), a recommendation made by the World Health Organization and ultimately adopted by Brazil. This allowed the digital vaccination card to become a reality: citizens can check their vaccination status online on ConecteSUS (https://conectesus-paciente.saude.gov.br/login) for all vaccines.

All data from the RNDS is available on the panel of administered doses and vaccine coverage, which directly consumes information from the National Health Data Network. Currently, the panel displays coverage for vaccines recommended for children under two years old. Although the panel does not yet show vaccine coverage for individuals older than two, it displays the number of doses administered for all vaccines.

To migrate the data to RNDS (National Network of Health Data), the old Information System of the National Immunization Program (SIPNI web or "Legacy") had its data input stopped, transferring

routine dose records made outside primary care to the new SIPNI system, already used for registering COVID-19 vaccine doses and directly integrated into RNDS. This occurred on June 1, 2023, affecting the recording of BCG and hepatitis B vaccine doses, typically administered in maternity wards. The 2.6 million doses administered from January to May 2023 and recorded in the legacy SIPNI still need to be uploaded to RNDS. Among these, 400 thousand are BCG doses and 600 thousand are hepatitis B doses. Hence, they have not been included in the calculation of vaccination coverage. Consequently, the national vaccination coverage for these two vaccines is still below the target: 61.4% and 55.5% for BCG and hepatitis B, respectively. The incorporation of the doses retained in the “Legacy” SIPNI is likely to increase the vaccination coverage of such vaccines. By the first semester of 2024, all data will be incorporated into RNDS.

In migrating data from the Primary Care Information System (*Sistema de Informação da Atenção Básica* - SISAB) to the National Network of Health Data (RNDS), 6 million out of 100 million administered doses were retained. These records did not match the vaccinated individual's CPF (Individual Registry Number) or National Health Card (*Cartão Nacional de Saúde* - CNS). Most of the retained records are for vaccines recommended in the first six months of life: inactivated polio vaccine (707,438 doses), pentavalent vaccine (707,720 doses), 10-valent pneumococcal vaccine (607,331 doses), rotavirus vaccine (527,496 doses), meningococcal C vaccine (512,988 doses), BCG (288,065 doses), and hepatitis B vaccine (322,557 doses).

By migrating these records to the RNDS, the vaccination coverage rates will better reflect the current situation. For instance, the pneumococcal vaccine coverage in <1-year-olds in 2023 would increase from 78.8% to 83.4%. The Ministry of Health team, in collaboration with states and municipalities, is working to rectify these records and submit them to the RNDS so that these doses are included in the calculation of vaccination coverage and are accounted for. Addressing the inconsistencies in vaccine doses and directly feeding them into the RNDS represents a significant effort for vaccination in the country, achievable through collaborative work with states and municipalities.

Other factors may have contributed to the calculated vaccination coverage for 2023 yet to reflect the gains achieved or hindering even more significant progress. Firstly, at this moment, the panel calculates vaccine coverage with doses administered up to two months ago (today, up to October 2023). Municipalities with their own information systems or that operate offline may take up to 4 months to send their data on doses administered. Secondly, during the second half of 2023, there was a varicella vaccine shortage due to the sanitary suspension of batches[5]. Finally, there was also a temporary shortage of meningococcal C vaccine.

As outlined, many challenges persist in advancing the vaccination agenda. However, there are reasons to celebrate the reversal of the declining trend in coverage of several vaccines in this first year of government and the increase in the number of municipalities that have fully achieved the vaccination coverage target. The National Vaccination Movement, with public opinion awareness, the resumption of regionalized communication campaigns, localized micro-planning actions including various extramural vaccination strategies, such as the participation of 3992 municipalities that conducted vaccinations in schools, and the integration of the information system, has been decisive in strengthening work in the territories and thus restoring a culture of immunization, a

source of pride in the country and internationally recognized, throughout the 50 years of the National Immunization Program.

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Data availability:

Until the vaccination panel is not launched, the data is available on demand to the Departamento do Programa Nacional de Imunizações. Email: pni@saude.gov.br / phone: (61) 3315-3874

Author's contribution statement:

All authors contributed equally for conceptualizing, analyzing data, writing, and critically revising the manuscript. All authors are responsible for the manuscript content.

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