ARQUIVOS DE ASMA, ALERGIA E IMUNOLOGIA

Review Article

Decreasing vaccination coverage in Brazil: causes, impacts, and intervention strategies

Queda da cobertura vacinal no Brasil: causas, consequências e estratégias de enfrentamento

Denise Salotti Augusto Pizani[1], Márcio Antônio Francisco Dearo[1], Aline Ferreira de Oliveira Pereira[1]

ABSTRACT

Immunization is a highly effective strategy, widely adopted worldwide, for the control and eradication of various diseases. However, in recent years, a significant decline in vaccination coverage has been recorded in Brazil. In this context, the present study aimed to highlight this decline by examining its causes and consequences for public health through a literature review. Sources included news reports, government websites, and national and international scientific articles published between 2014 and 2025, retrieved from the Google Scholar, PubMed, and SciELO databases. After a rigorous selection process, 51 publications were included to support this article. Among the main factors associated with declining vaccination coverage are the spread of misinformation (fake news) and the rise of anti-vaccine movements. These factors contribute to the resurgence of previously eradicated diseases, posing a serious threat to public health. In response, the Brazilian government has implemented several measures, including the distribution of educational materials and the intensification of vaccination programs. Considering that vaccination is one of the most important tools for disease prevention in public health, and in view of the possible reemergence of diseases such as poliomyelitis, strategies to increase vaccination coverage must be effective both in expanding access and in disseminating reliable information to the population.

Keywords: Immunization, mass vaccination, communicable diseases, vaccines, health strategies.

RESUMO

O processo de imunização representa uma estratégia altamente efetiva, adotada mundialmente para controle e erradicação de diversas doenças. Entretanto, nos últimos anos, tem sido registrada uma significativa diminuição na taxa de cobertura vacinal no Brasil. Diante disso, o presente estudo tem como objetivo evidenciar essa queda, abordando suas causas e consequências para a saúde pública, através de uma revisão da literatura. Para tanto, foram utilizadas como fontes: notícias, *sites* governamentais e artigos científicos nacionais e internacionais publicados entre os anos de 2014 e 2025, disponíveis nas bases de dados Google Acadêmico, PubMed e SciELO. Após análise criteriosa, 51 publicações foram selecionadas para embasar a redação deste artigo. Dentre os principais fatores associados à redução da cobertura vacinal, destacam-se a disseminação de informações falsas (*fake news*) e o avanço de movimentos antivacinas. Essas condições favorecem o ressurgimento de doenças anteriormente erradicadas, representando uma ameaça à saúde coletiva. Como resposta a esse cenário, o governo brasileiro tem implementado diversas medidas, como a distribuição de materiais informativos e a intensificação das campanhas de vacinação. Considerando a vacina como um dos principais instrumentos de prevenção em saúde pública e diante da possibilidade de reemergência de doenças como a poliomielite, conclui-se que as estratégias voltadas ao aumento da cobertura vacinal devem ser eficazes tanto na ampliação do acesso quanto na disseminação de informações confiáveis à população.

Descritores: Imunização, vacinação em massa, doenças transmissíveis, vacinas, estratégias de saúde.

Introduction

Vaccination, one of the main strategies for preventing infectious diseases, has played a fundamental role in the control and eradication of various pathologies, as well as in reducing infant mortality.[1] The Brazilian National Immunization Program has been internationally recognized for the

1. Universidade Paulista, Medicina - São José do Rio Pardo, SP, Brazil.

Submitted Oct 17 2024, accepted Jul 28 2025.

Arq Asma Alerg Imunol. 2025;9(2):216-26.

http://dx.doi.org/10.5935/2526-5393.20250013-en

wide range of vaccines it provides and its history of achieving high vaccination coverage rates.[2,3]

However, Brazil has seen a marked reduction in immunization adherence in recent years, which can be attributed to multiple factors. One is related to the success of the vaccination campaigns, which has led to the disappearance of many diseases, creating the false notion that these diseases are no longer a threat.[3,4] Added to this is the growth of anti-vaccine movements, fueled by the spread of false information about the safety, efficacy, and possible adverse effects of vaccines.[3,5] Social distancing measures during the COVID-19 pandemic, coupled with the fear of contagion, also significantly reduced vaccination rates in 2019 and 2020.[6,7]

Due to vaccine hesitancy, previously controlled diseases, such as measles, have resurged. Now there is even a real risk of polio, which, in its most severe form, can cause infantile paralysis, and immunization is the only form of prevention against it.[8,9] Thus, although vaccination is essential for public health, its rejection by the population challenges both individual and collective health, requiring effective action through public policy.[3,10]

Given this scenario, we investigated the decline of vaccination coverage in Brazil, identifying its main causes and consequences, in addition to reviewing government strategies to reverse the trend.

Methods

This study was based on immunization data published online by the Oswaldo Cruz Foundation (Fiocruz), UNICEF, and Brazilian universities, in addition to current immunization data from government platforms, such as DATASUS and the Ministry of Health. We focused on vaccine-preventable diseases, particularly polio and measles. For the literature review, the Google Scholar, PubMed, and SciELO databases were searched for articles published between 2014 and 2025 in national and international English-language journals. The following descriptors were used collectively and separately: “Immunization”; “Mass Vaccination”; “Communicable Diseases”; “Vaccines”; and “Health Strategies”. The search was conducted between 2022 and 2025, initially resulting in 98 publications. After careful analysis, 47 were excluded because they did not specifically address vaccine hesitancy or because they presented redundant content, resulting in a total of 51 publications.

Literature review and discussion

In 1973, the Ministry of Health established the National Immunization Program to coordinate and organize vaccination efforts in Brazil, which until then were characterized by low coverage and irregular implementation.[11-13] This program is responsible for setting standards related to the acquisition, storage, and distribution of vaccines at the municipal, state, and federal levels. Its actions are based on a vaccination schedule regulated by the Ministry of Health that can be altered according to the country’s epidemiological needs.[13] Table 1 presents the 2024 National Vaccination Calendar for children based on Ministry of Health guidelines, including priority vaccines provided free of charge by the public health system.[11]

The vaccination coverage rate represents the proportion of vaccinated people in relation to the target population, multiplied by 100. The National Immunization Program uses this indicator to monitor vaccination progress and the achievement of its goals, such as reaching 95% vaccination coverage in all municipalities and vaccinating 100% of newborns.[13,14] Vaccination campaigns, a primary strategy for achieving these goals, are conducted during pandemics, epidemics, and outbreaks, as well as on other occasions to ensure that certain vaccine-preventable diseases remain eradicated.[13] Table 2 presents the vaccination campaigns performed in 2024 in Brazil.

In addition to being a primary preventive measure, vaccination is an effective, low-cost intervention that promotes significant changes in global epidemiology by reducing the impact of vaccine-preventable diseases. Vaccination coverage of 95% establishes what is called “herd immunity,” guaranteeing protection even for unvaccinated individuals due to the reduced concentration of circulating pathogens.[14,15] However, despite historical progress, formerly high immunization rates have been declining in recent years, as shown in Table 3 and Figure 1.

Several factors have contributed to these decreasing immunization rates, of which the following stand out: the spread of anti-vaccine movements, the dissemination of false information about vaccination, a false sense of security due to the disappearance of diseases, social distancing measures used during the COVID-19 pandemic, fear of adverse effects after vaccination, as well as technical aspects, such as logistical failures in distribution and insufficient

Table 1
The 2024 National Childhood Vaccination Calendar – vaccines provided by the Brazilian Unified Health System

Vaccine	Target diseases	Recommended age
Bacillus Calmette-Guérin	Tuberculosis (meningeal and miliary)	At birth: single dose
Recombinant hepatitis B	Hepatitis B	At birth
Inactivated polio	Polio	1st dose: 2 months/ 2nd dose: 4 months/ 3rd dose: 6 months
Attenuated oral polio [a]	Polio	1st booster: 15 months/ 2º booster: 4 years
Attenuated human rotavirus	Rotavirus diarrhea	1st dose: 2 months/ 2nd dose: 4 months
DTP-HBV-HIB	Diphtheria, tetanus, whooping cough, *Haemophilus influenzae* type B infections, hepatitis B	1st dose: 2 months 2nd dose: 4 months 3rd dose: 6 months
10-valent pneumococcal	Pneumonia, meningitis, ear infections, Sinusitis caused by the serotypes that make up the vaccine.	1st dose: 2 months 2nd dose: 4 months Booster: 12 months
Meningococcal C conjugate	Meningococcal meningitis type C	1st dose: 3 months Booster: 12 months
COVID-19	Severe COVID-19 cases and deaths due to SARS-CoV-2	1st dose: 6 months 2nd dose: 7 months
Attenuated yellow fever	Yellow fever	Dose: 9 months Booster: 4 years
Attenuated measles, mumps and rubella	Measles, mumps and rubella	12 months
Attenuated measles, mumps, rubella, and varicella	Measles, mumps, rubella and chickenpox	15 months (2nd dose of MMR vaccine and 1st dose of chickenpox vaccine)
Hepatitis A (inactivated)	Hepatitis A	15 months
Diphtheria, tetanus, and pertussis	Diphtheria, tetanus, and whooping cough	1st booster: 15 months 2nd booster: 4 years
Diphtheria and tetanus	Diphtheria and tetanus	Beginning at 7 years
Human papillomavirus quadrivalent recombinant	Human papillomavirus 6, 11, 16 and 18	9 or 10 years: single dose (boys and girls)
23-valent pneumococcal polysaccharide vaccine	Bacterial meningitis, pneumonia, and sinusitis, among others	Beginning at 5 years for Indigenous peoples. The 2nd dose should be administered 5 years after the 1st dose
Attenuated varicella	Chickenpox	4 years

[a] The oral polio vaccine was removed from the Brazilian Ministry of Health's National Immunization Schedule for children in October 2024.
DTP-HBV-HIB: diphtheria, tetanus, and pertussis/hepatitis B virus/*Haemophilus influenzae* type b.
Source: Brazilian Ministry of Health.[11]

Table 2
Brazilian vaccination campaigns in 2024

Campaign	Target population
Flu	Children aged 6 months to < 6 years; adults aged ≥ 60 years; pregnant women; truck drivers; Indigenous people; people with disabilities; teachers; health care workers; postpartum women; Quilombola communities; homeless individuals; people with chronic non-communicable diseases or other special clinical conditions; port workers; security, rescue and armed forces personnel; public transportation workers
Flu in northern Brazil	In addition to the above mentioned groups, the following were added: young offenders aged 12 to 21 years; prison inmates; prison system employees
COVID-19	Children aged 6 months to < 5 years; people aged ≥ 60 years; people with permanent disabilities; staff and residents of long-term care facilities; immunocompromised individuals; Indigenous people living on and off Indigenous lands; Ribeirinho communities; Quilombola communities; pregnant and postpartum women; health care workers; people with comorbidities; young offenders; homeless individuals
Polio	Children aged < 5 years
School vaccinations	Children and adolescents aged < 15 years

Source: Ministry of Health - National Vaccination Movement .[41]

effort by family health services during the vaccination process.[3-7,15,16]

Anti-vaccine movements are strongly associated with the spread of misinformation, a phenomenon that has intensified with the advent and expansion of social media. A prime example of such misinformation is an article published by British gastroenterologist Andrew Wakefield in The Lancet, which suggested a link between the MMR vaccine and the development of autism in children. However, after serious flaws were identified in the study, including conflicts of interest and data manipulation, the journal itself retracted the publication. As a consequence, Wakefield's medical license was revoked, and the article was officially removed from the journal's archives. Since then, numerous rigorous studies have failed to substantiate the relationship Wakefield described.[3,6,16-18]

Similarly, with the virtual disappearance of many vaccine-preventable diseases, segments of the population have begun to question the benefits of vaccination, including the mistaken perception that the rare adverse effects caused by vaccines are more harmful than the diseases they prevent.[19,20] This distrust was evident in the results of a 2022 survey, which revealed that many Brazilians consider the potential adverse effects a serious health risk, in addition to their suspicion of pharmaceutical companies, believing that they conceal information about the dangers of vaccines.[21] Furthermore, the need for protective measures during the COVID-19 pandemic in 2020 and 2021, such as social distancing and the partial interruption of transportation services, reduced demand for routine basic vaccinations, which helps explain the decrease in vaccination coverage rates during this period.[6,7,22]

Technical factors, such as failures in the production and distribution of vaccines, have also contributed to declining vaccination rates. A 2022 study in *Cadernos de Saúde Pública* highlighted the low availability of vaccines in Brazil, including significant regional inequality.[6,23] In 2023, for example, the Brazilian National Health Surveillance Agency (Anvisa) suspended distribution of the measles, mumps, rubella, and varicella (MMRV) vaccine after detecting changes in its manufacturing process. This interruption

Table 3
Vaccination coverage in Brazil from 2015 to 2024 (percentage)

Immunobiological	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024[a]
BCG	105.08[b]	95.55	97.98	99.72	86.67	77.14	74.97	90.06	81.46	83.92
Hepatitis B (age < 30 days)	90.93	81.75	85.88	88.40	78.57	65.77	67.03	82.73	77.69	86.95
Hepatitis B	97.74	105.19	84.40	88.53	70.77	77.86	71.53	77.24	85.53	85.48
Human rotavirus	95.35	88.98	85.12	91.33	85.40	77.94	71.80	76.60	85.76	84.95
Meningococcal C	98.19	91.68	87.44	88.49	87.41	79.23	72.17	78.63	88.23	97.04
DTP-HBV-HIB	96.30	89.27	84.24	88.49	70.76	77.86	71.53	77.24	85.51	85.46
Pneumococcus	94.23	95.00	92.15	95.25	89.07	82.04	74.84	81.51	88.40	85.31
Polio	98.29	84.43	84.74	89.54	84.19	76.79	71.04	77.20	86.49	85.31
Polio (4 years)	0.00	0.00	62.26	63.62	68.45	67.58	54.61	67.56	*	*
Yellow fever	46.31	44.59	47.37	59.50	62.41	57.64	58.19	60.67	73.41	76.72
Hepatitis A	97.07	71.58	78.94	82.69	85.02	75.90	67.54	72.99	82.80	84.02
Pneumococcal (1st booster)	88.35	84.10	76.31	81.99	83.47	72.14	66.14	71.54	83.23	87.70
Pneumococcal C (1st booster)	87.85	93.86	78.56	80.22	85.78	75.96	68.01	75.34	86.58	98.14
Polio (1st booster)	84.52	74.36	73.57	72.83	74.62	69.30	60.50	67.71	78.09	83.54
MMR dose 1	96.07	95.41	86.24	92.61	93.12	80.88	74.94	80.70	88.39	91.72
MMR dose 2	79.94	76.71	72.94	76.89	81.55	64.27	53.20	57.64	65.62	77.55
MMRV	77.37	79.04	35.44	33.26	34.24	21.01	6.27	10.43	*	*
DTP	96.90	89.53	84.45	88.70	70.94	77.99	71.59	77.25	85.61	85.52
DTP (booster at 4 and 6 years)	0.00	2.73	66.08	68.52	53.74	73.49	57.99	66.97	*	*
DTP (1st booster)	85.78	64.28	72.40	73.27	57.08	77.21	63.65	67.45	78.11	81.95
Adult diphtheria and tetanus and DTaP for pregnant women	45.57	31.53	34.73	44.99	45.02	22.89	18.97	20.33	75.35	58.51
Chickenpox (varicella)	0.00	0.00	0.00	0.00	0.00	74.43	67.05	73.32	71.03	72.42

BCG: Bacillus Calmette-Guérin; DTaP: acellular DTP vaccine; DTP-HBV-HIB: diphtheria, tetanus, and pertussis/hepatitis B virus/ Haemophilus influenzae type b; MMR: measles/mumps/rubella; MMRV: MMR+varicella.

[a] Preliminary data, updated on September 15, 2024.

[b] Vaccination coverage above 100% may be related to the use of underestimated population figures, generating higher results than the actual vaccination coverage rates in the evaluated location. The formula for calculating coverage is the number of final doses administered divided by the target population, multiplied by 100.[51]

* Data unavailable from DATASUS.

Source: National Immunization Program Information System (SIPNI – http://sipni.datasus.gov.br).

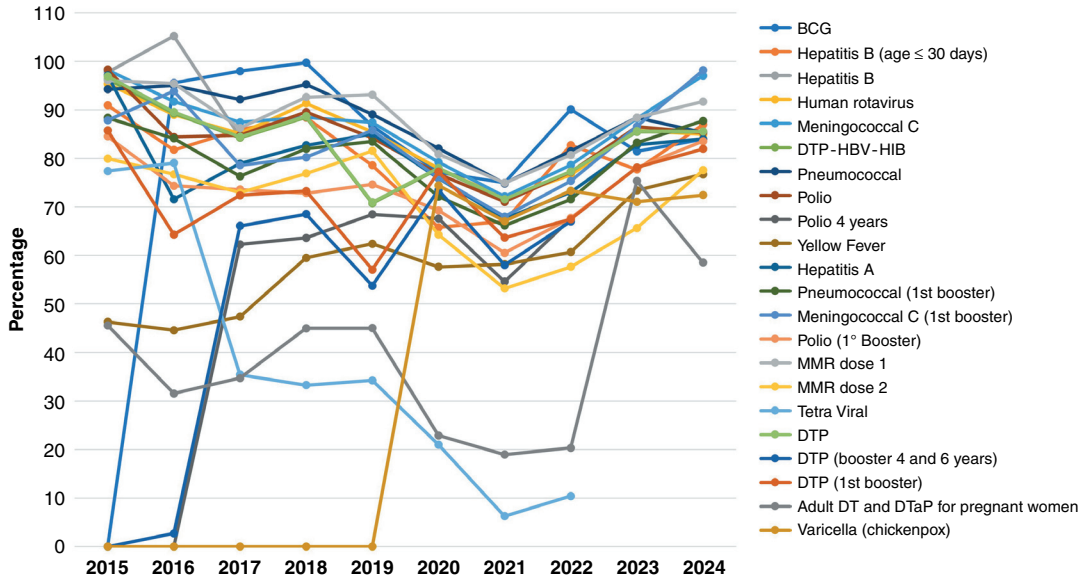

Figure 1

Vaccination coverage in Brazil between 2015 and 2024

BCG: Bacillus Calmette-Guérin; DTP-HBV-HIB: diphtheria, tetanus, and pertussis/hepatitis B virus/*Haemophilus influenzae* type b; MMR: measles/mumps/rubella.

Source: National Immunization Program Information System (SIPNI - http://sipni.datasus.gov.br). Preliminary data, updated on Sept. 15, 2024.

could explain the lack of vaccination coverage data for this product in 2023 and 2024 (Table 3). It should also be noted that administration of this vaccine had already been weak in previous years due to distribution irregularities. For example, the state of Alagoas has not received a shipment of this vaccine since 2018.[24,25]

Furthermore, the Family Health Strategy, whose activities include vaccine administration, is directly associated with factors that influence the effectiveness of vaccination coverage, such as health unit infrastructure, geographic location, vaccination room operating hours, and the quality of interpersonal relationships between health professionals and service users.[15,23,26]

Vaccine hesitancy has significantly contributed to the reappearance of diseases previously considered eradicated. A prime example is the resurgence of measles in Brazil in 2018, just two years after the Pan American Health Organization had certified that the virus had been eliminated. Factors that contributed to its return include low measles, mumps, and rubella vaccination coverage in 2017, which only reached 86.24%. This scenario had a greater impact in northern Brazil, especially due to the intense migration of citizens from Venezuela, where a measles outbreak had occurred in 2017.[27,28] In subsequent years, vaccination rates remained below the ideal level: 92.61% in 2018 and 93.12% in 2019. From 2020 onwards, the decline was even sharper due to the COVID-19 pandemic, with rates of 80.88% in 2020 and 74.94% in 2021. Although the vaccination rates recovered slightly in 2022 (80.70%) and 2023 (88.39%), they were still below those of the pre-pandemic period, being insufficient to ensure collective protection.[6,7,22] Figure 2 shows measles vaccination coverage in Brazil between 2015 and 2024.

According to recent data, COVID-19 vaccination coverage in Brazil remains less than ideal, with particularly low adherence in certain age groups. It is estimated that 86.64% of the population received 2 doses of the monovalent vaccine, 56.44% received 3 doses, and only 19.69% completed the 4-dose schedule. There was a significant discrepancy between age groups, especially among children, whose vaccination schedule includes 2 doses administered at 6 and 7 months of age. Coverage was

only 36.5% among children 6 months to 2 years of age and 31.4% among 3- to 4-year olds.[11,29,30]

Among those aged ≥ 5 years, vaccination was recommended exclusively for priority groups, such as pregnant women, postpartum women, immunocompromised individuals, and health care workers, with annual boosters or, in the case of those aged ≥ 60 years, a booster every 6 months. Among children aged 5 to 11 years, 60.7% received 2 doses and 24.1% received a single dose. Among individuals aged 12 to 59 years, 2-dose vaccination coverage ranged from 85% to 92%; 3-dose coverage ranged from 40% to 70%; and 4-dose coverage ranged from 30% to 44% (in the 40- to 59-year age group). The best rates were among older adults: more than 95% received 2 doses, 80% received 3 doses, and 56.2% received 4 doses.[11,29,30]

The renewed risk of polio has led health authorities to issue warnings about low vaccination coverage. Although the disease has been eradicated in the Americas, it is still endemic in some regions of the world, and population mobility increases the possibility of reintroduction into areas where it had previously been eradicated. During the COVID-19 pandemic in Brazil, polio vaccination rates declined significantly (to 76.79% in 2020 and 71.04% in 2021), as shown in Table 3, Figure 1, and Figure 3.[3,31-33] In response, the National Immunization Program announced that the bivalent oral polio vaccine would be replaced with the inactivated polio vaccine by October 2024, in alignment with World Health Organization guidelines. However, this transition is contingent upon maintaining high vaccination coverage with inactivated polio vaccine.[34]

Meanwhile, since 2023 Brazil has seen a significant increase in pertussis (whooping cough) cases, of which the last endemic incidence had occurred in 2014. For example, in the city of São Paulo between January and June 2024, 139 cases of the disease were reported, a 768.7% increase compared to the same period in 2023.[35] This reinforces the fact that, although vaccination is mandatory in Brazil and is freely available through the public health system, adherence has declined alarmingly, which has contributed to the resurgence of preventable diseases, compromising both individual health and collective protection.[26,36] Such a situation also raises bioethical issues, especially the conflict between justice, ie, promoting the common good through universal vaccine provision, and autonomy, ie, ensuring an individual's right to choose.[37]

In this context, aiming to address the factors associated with vaccine rejection, in 2019 the Ministry of Health published a leaflet entitled "Ten Steps to Expand Vaccination Coverage in Primary Care". The following stand out among its guidelines: ensuring that vaccination rooms are in operation at all times during the health unit's opening hours, if not after hours as well; combating the dissemination of false information; and ensuring the supply of vaccines in adequate quantity and quality.[6,38]

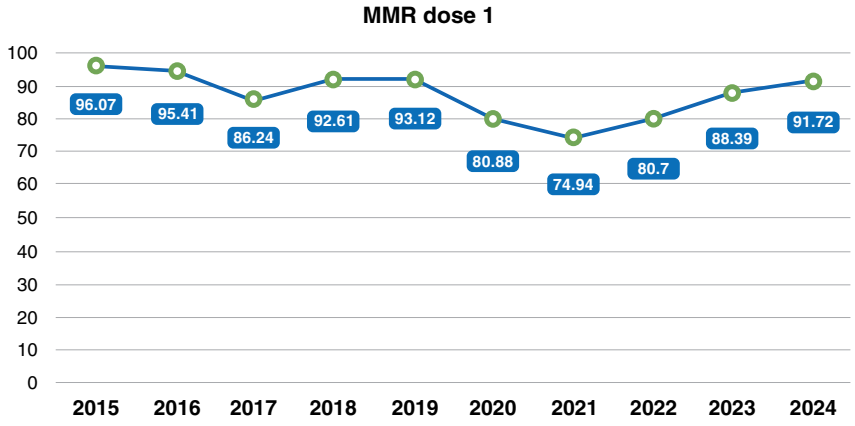

Figure 2
Measles vaccination coverage rate in Brazil between 2015 and 2024 (percentage)
Source: National Immunization Program Information System (SIPNI - http://sipni.datasus.gov.br). Preliminary data, updated on 09/15/2024.

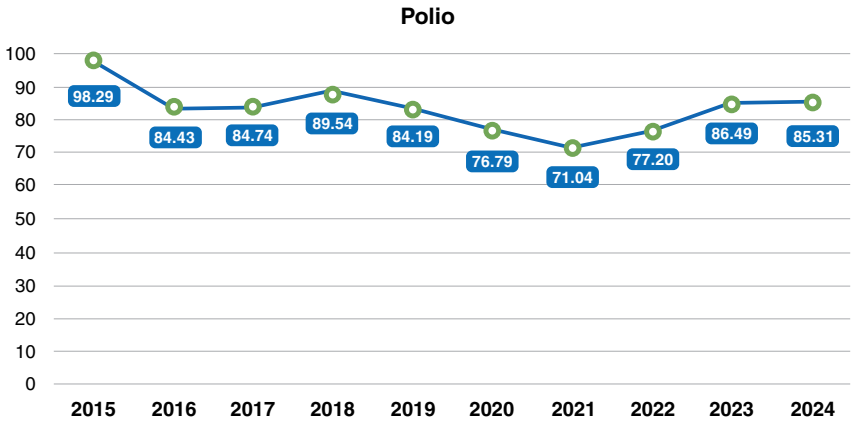

Figure 3
Polio vaccination coverage rate in Brazil between 2015 and 2024 (in percentage)

Source: National Immunization Program Information System (SIPNI - http://sipni.datasus.gov.br). Preliminary data, updated on 09/15/2024.

Additionally, in 2021, through its Institute of Immunobiological Technology (Bio-Manguinhos), Fiocruz launched its High Vaccination Rate Recovery Project, developed in partnership with the Brazilian Immunization Society and the National Immunization Program. The project aims to achieve high and homogeneous levels of vaccination coverage nationwide by 2025.[39] Moreover, in June 2022, the National Health Council began the "Vaccinate More" campaign to expand access to information about immunization through free distribution of communication materials to public establishments.[40] In 2023, the Ministry of Health also established its own national vaccination movement to recover high vaccination coverage rates, including COVID-19 and other vaccines of the national vaccination calendar.[41] As a result of these institutional efforts, vaccination coverage rates increased considerably in 2022 and 2023 (Table 3 and Figure 1). However, the established targets for most vaccines have not been fully met.[42]

The COVID-19 pandemic significantly reduced vaccination coverage rates globally, not just in Brazil. It is estimated that at least 68 countries were affected, compromising the vaccination of approximately 80 million children. During the first 5 months of the pandemic, a number of countries canceled their immunization campaigns, contributing to the resurgence of previously controlled diseases. There were reports of diphtheria cases in Venezuela, Pakistan, Nepal, Bangladesh, and Yemen, as well as cholera outbreaks in Bangladesh, Cameroon, Mozambique, South Sudan, and Yemen. Furthermore, a total of 46 polio vaccination campaigns were postponed in 38 countries, mainly in Africa, resulting in a 2021 outbreak in Niger. Childhood vaccination coverage was significantly reduced in the United States during the same period, decreasing 63% in New York, 40% in California, and 45% in Ohio.[43]

In 2023, global vaccination coverage remained stagnant and below pre-pandemic rates. A complete schedule of the diphtheria, tetanus, and pertussis vaccine, considered one of the main indicators of vaccination performance, was administered to only 108 million children. Meanwhile, the number of unvaccinated children increased from 13.9 million in 2022 to 14.5 million in 2023, and the final dose was not administered in another 6.5 million.[44,45] Measles vaccine coverage was also insufficient, with global rates of 83% for the first dose and 74% for the second dose both below the 95% recommended by the World Health Organization to prevent outbreaks. As a consequence, 103 countries have reported measles outbreaks in the last 5 years.[44,45]

Similar challenges have occurred for COVID-19 vaccination. By December 2023, primary vaccination was complete in only 67% of the world's population, which had only increased modestly (to 70.7%) by August 2024, highlighting the slow pace of global immunization progress.[46] Disparities between countries with different income levels were also evident: those with low gross domestic products had up to 70% lower vaccination coverage than high-income countries.[47] In Peru, for example, there was a direct correlation between vaccination coverage and human development index, reflecting regional inequalities within developing countries.[48]

Unequal vaccine distribution throughout the world has further exacerbated this situation. It is estimated that, in February 2021, 75% of the 191 million administered doses were concentrated in just 10 high-income countries, which together represent only 16% of the world's population.[49,50] To mitigate these disparities, initiatives such as the COVAX consortium were created to promote more equitable vaccine distribution. However, by January 2022, only 61% of the planned doses had actually been delivered.[46]

Thus, vaccination coverage has not declined due to the pandemic alone; it has been decreasing for a number of years. This compromises public health, facilitating the return of previously controlled diseases and risking the reintroduction of serious pathologies that have already been eradicated. Despite government efforts to reverse this decline, current rates remain below recommended levels.

Conclusions

Vaccination is widely recognized as one of the most effective interventions to prevent infectious diseases. Therefore, vaccine hesitancy must be addressed assertively by disseminating empirical evidence, creating educational campaigns, answering the public's questions, and promoting government initiatives to ensure adequate vaccine distribution and access for all citizens.

The imminent return of previously eradicated diseases, such as polio, reinforces the urgent need for stronger public policies to increase vaccination coverage. However, studies assessing the effectiveness of these strategies are also needed to guarantee that established goals are met and that the population is adequately protected.

References

1. Magalhães CR, Velasco FZB, Pedroza GGO, Rosa GA, Silvestre MGP, Batista IGS. Pesquisa sobre o movimento antivacina, realizada nos projetos de extensão do técnico de enfermagem do CEFET-RJ, durante a pandemia. Revista Expressa Extensão. 2021;26(1):400-10.
2. Milani LRN, Busato IMS. Causas e consequências da redução da cobertura vacinal no Brasil. Revista de Saúde Pública do Paraná. 2021;4(2):157-71.
3. Cruz A. A queda da imunização no Brasil. Revista Consensus. 2017;out-dez. Available from: https://fiocruz.br/sites/fiocruz.br/files/documentos/revistaconsensus_25_a_queda_da_imunizacao.pdf. Accessed on: Apr 21 2022.
4. Amaral MA. Pandemia acentuou queda de vacinação no Brasil. Suplemento do Jornal Unesp [Internet]. Available from: https://jornal.unesp.br/2022/02/22/pandemia-acentuou-queda-de-vacinacao-no-brasil/. Accessed on: Apr 21 2022.
5. Nassarala APA, Doumit AM, Melo CF, Léon LC, Vidal, RAR, Moura LR. Dimensões e consequências do movimento antivacina na realidade brasileira. Revista Educação em Saúde. 2019;7(Supl 1).
6. Procianoy GS, Junior FR, Lied AF, Jung LFPP, Souza MCSC. Impacto da pandemia do COVID-19 na vacinação de crianças de até um ano de idade: um estudo ecológico. Ciência e Saúde Coletiva. 2022;27(3):969-78.
7. UNICEF, Fundo das Nações Unidas para a Infância. OMS e UNICEF alertam para um declínio na vacinação durante a pandemia de Covid-19 [Internet]. 2020; jul. Available from: https://www.unicef.org/brazil/comunicados-de-imprensa/oms-e-unicef-alertam-para-um-declinio-na-vacinacao-durante-pandemia-de-covid-19. Accessed on: Sep 15 2022.
8. Brasil, Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de Análise em Saúde e Vigilância de Doenças Não Transmissíveis. Saúde Brasil 2020/2021: uma análise de situação de saúde e da qualidade da informação [Internet]. 2021. Available from: https://www.gov.br/saude/pt-br/centrais-de-conteudo/publicacoes/svsa/vigilancia/saude_brasil_2020_2021_situacao_saude_web.pdf/view. Accessed on: Apr 16 2022.
9. Brasil, Ministério da Saúde. Saúde de A a Z. Poliomielite [Internet]. 2022. Available from: https://www.gov.br/saude/pt-br/assuntos/saude-de-a-a-z/p/poliomielite. Accessed on: Mar 30 2022.
10. Silva LLM, Neves RA, Garrido RG, Gomes DM. Antigos argumentos, novos desafios: políticas públicas e o movimento antivacina. Research, Society and Development. 2021;10(14).
11. Brasil, Ministério da Saúde. Calendário Nacional de Vacinação [Internet]. 2024. Available from: https://www.gov.br/saude/pt-br/vacinacao/calendario. Accessed on: May 17 2025.
12. Brasil, Ministério da Saúde, Fundação Oswaldo Cruz. Programa Nacional de Imunizações é um marco histórico na saúde pública brasileira [Internet]. 2022. Available from: https://fiocruz.br/noticia/2022/06/programa-nacional-de-imunizacoes-e-um-marco-historico-na-saude-publica-brasileira. Accessed on: Sep 15 2022.
13. Koehler MC, Santos EP. O calendário de vacinação brasileiro e as estratégias para imunização da população. In: Silva MN, Flauzino RF, eds. Rede de frio: gestão, especificidades e atividades. Editora FIOCRUZ. 2017;p. 47-78.
14. Leite IS, Ribeiro DAG, Vieira ILV, Gama FO. A evolução das coberturas vacinais brasileiras e os impactos provocados pela pandemia de Covid-19 nas metas de imunização. Research, Society and Development. 2022;11(11).
15. Duarte DC, Oliveira VC, Guimarães EAA, Viegas SMF. Acesso à vacinação na Atenção Primária na voz do usuário: sentidos e sentimentos frente ao atendimento. Esc Anna Nery. 2019;23(1).
16. Azevedo ALS, Lara BGS, Silva MG, Sanches JCT, Silva ACRA. Diminuição na cobertura vacinal contra o Sarampo no Brasil e suas consequências. Universitas - Revista Científica do UniSALESIANO de Araçatuba. 2021;17(17):43-54.

17. Takada R, Girardi A. Controvérsias em torno das vacinas. ComCiência [online]. 2014;162. Available from: https://comciencia.scielo.br/scielo.php?script=sci_arttext&pid=S1519-76542014000800006&lng=pt&nrm=iso.
18. Benecke O, DeYoung SE. Anti-Vaccine Decision-Making and Measles Resurgence in the United States. Glob Pediatr Health. 2019 Jul 24;6:2333794X19862949.
19. Camargo Jr KR. Lá vamos nós outra vez: a reemergência do ativismo antivacina na Internet. Cad Saúde Pública 2020;36(14):e00037620. doi: 10.1590/0102-311x00037620.
20. Sociedade Brasileira de Imunizações. Especialistas debatem desafios e estratégias para reverter baixas coberturas vacinais [Internet]. 2019; 16 set. Available from: https://sbim.org.br/noticias/1122-especialistas-debatem-desafios-e-estrategias-para-reverter-baixas-coberturas-vacinais . Accessed on: Oct 05 2024.
21. Massarini L, Polino C, Moreira I, Fagundeds V, Castelfranchi Y. Confiança na ciência no Brasil em tempos de pandemia. Resumo executivo. Instituto Nacional de Ciência e Tecnologia em Comunicação Pública da Ciência e Tecnologia (INCT-CPCT) [Internet]. 2022. Available from: https://www.inct-cpct.ufpa.br/2022/12/15/disponivel-o-resumo-executivo-da-survey-confianca-na-ciencia-no-brasil-em-tempos-de-pandemia-realizada-pelo-inct-cpct-2/ . Accessed on: Sep 15 2023.
22. Colla FC, Eberhardt LD. O impacto da Pandemia de Covid-19 nas Coberturas Vacinais dos Estados Brasileiros. Rev Bras Promoç Saúde. 2023;36:14060.
23. Neves RG, Saes MO, Machado KP, Duro SMS, Facchini LA. Tendência da disponibilidade de vacinas no Brasil: PMAQ-AB 2012, 2014 e 2018. Cad Saúde Pública. 2022 May 9;38(4):PT135621.
24. Brasil, Ministério da Saúde. Nota Técnica nº 56/2023-CGGI/DPNI/SVSA/MS [Internet]. 2023. Available from: http://200.187.87.14/Sino.Siave/arquivo?Id=126287. Accessed on: Sep 19 2024.
25. Secretaria do Estado da Saúde do Alagoas. Nota Informativa SEVISA nº 43/2023 [Internet]. 2023. Available from: https://www.saude.al.gov.br/wp-content/uploads/2023/12/Nota-Informativa-SEVISA-43-Desabastecimento-varicela.pdf#:~:text=indisponibilidade%20das%20Vacinas%20Varicela%20Monovalente%20e%20tetra,2023%2C%20o%20Departamento%20de%20Imuniza%C3%A7%C3%A3o%20e%20Doen%C3%A7as . Accessed on: Sep 19 2024.
26. Santana SC, Consoline LS, Santana KC, Verissimo TDC. Imunização: a falta de adesão como um problema de saúde pública. Revista Científica da Faculdade de Educação e Meio Ambiente. 2022; 13(edespmulti).
27. Santos MES, Guide TV, Ferraz JSP, Gaspar MCS, Bhering CA. Sarampo: perfil epidemiológico dos pacientes internados no Brasil no período de 2016 a 2021. Revista Ibero-Americana de Humanidades, Ciência e Educação. 2022;8(4).
28. Peixoto MEG, Neves ACF, Aguiar MCR, Fonseca LS, Matioli LM, Bhering CA. A reemergência do sarampo no Brasil: falha da cobertura vacinal. Revista Ibero-Americana de Humanidades, Ciência e Educação. 2022;8(7).
29. Brasil, Ministério da Saúde. Cobertura vacinal contra a COVID-19 nas residências [Internet]. Available from: https://infoms.saude.gov.br/extensions/SEIDIGI_DEMAS_COBERTURA_COVID_RESIDENCIA/SEIDIGI_DEMAS_COBERTURA_COVID_RESIDENCIA.html. Accessed on: May 17 2025.
30. Brasil, Ministério da Saúde. Esquema vacinal – COVID-19 [Internet]. 2024. Available from: https://www.gov.br/saude/pt-br/campanhas-da-saude/2024/covid-19/esquema-vacinal. Accessed on: May 17 2025.
31. Brasil, Ministério da Saúde. Fundação Oswaldo Cruz. OMS alerta para redução da cobertura vacinal contra a Pólio nas Américas [Internet]. 2018. Available from: https://fiocruz.br/noticia/2018/11/oms-alerta-para-reducao-da-cobertura-vacinal-contra-polio-nas-americas. Accessed on: Sep 15 2025.
32. Paganini BRO, Moroskoski M, Oliveira RR, Silva MAP. Distribuição e autocorrelação espacial da cobertura vacinal contra a poliomielite. Research, Society and Development. 2022;11(6):e32811629258.
33. Gomes MG, Freitas FT, Dias JL, Figueiredo Júnior HS. Análise epidemiológica da poliomielite viral no Brasil nos últimos cinco anos. REASE [Internet]. 2022;8(3):1943-54. doi: 10.51891/rease.v8i3.4794.
34. Brasil, Ministério da Saúde. Informe técnico: retirada da vacina poliomielite 1 e 3 atenuada e adoção do esquema exclusivo com vacina poliomielite 1, 2 e 3 inativada [Internet]. 2024. Available from: https://www.gov.br/saude/pt-br/vacinacao/informes-tecnicos/retirada-da-vacina-poliomielite-1-e-3-atenuada-e-adocao-do-esquema-exclusivo-com-vacina-poliomielite-1-2-e-3-inativada.pdf. Accessed on: May 16 2025.
35. Labolssière P. Coqueluche: saiba mais sobre a doença que voltou a preocupar o mundo. Portal Agência Brasil/EBC [site na Internet]. 2024; 16 jun. Available from: https://agenciabrasil.ebc.com.br/saude/noticia/2024-06/coqueluche-saiba-mais-sobre-doenca-que-voltou-preocupar-o-mundo. Accessed on: Sep 10 2024.
36. Pereira V. Cobertura vacinal no Brasil está em índices alarmantes. Fiocruz [site na Internet]. 2022; 25 Ago. Available from: https://fiocruz.br/noticia/2022/08/cobertura-vacinal-no-brasil-esta-em-indices-alarmantes. Accessed on: Sep 15 2024.
37. Lima AG, Costa RSL, Júnior JJAS, Bortolini CSF, Júnior LMS, Davalos LMS, et al. A visão dos princípios bioéticos a respeito da imunização. Research, Society and Development. 2022;11(11): e442111133935.
38. Brasil. Ministério da Saúde. Dez passos para ampliação das coberturas vacinais na Atenção Primária à Saúde [Internet]. Available from: http://189.28.128.100/dab/docs/portaldab/documentos/folder10pontos.pdf. Accessed on: Sep 15 2024.
39. Homma A, Maia MLS, Azevedo ICA, Figueiredo IL, Gomes LB, Pereira CVDC, et al. Pela reconquista das altas coberturas vacinais [For the return of high vaccination coverage]. Cad Saúde Pública. 2023 Apr 7;39(3):e00240022.
40. Brasil, Ministério da Saúde, Conselho Nacional de Saúde (CNS). Vacina Mais: CNS, Conass, Conassems e OPAS/OMS se unem para promover campanha de incentivo à vacinação [Internet]. 2022; 29 jul. Available from: https://www.gov.br/conselho-nacional-de-saude/pt-br/assuntos/noticias/2022/junho/vacina-mais-cns-conass-conasems-e-opas-oms-se-unem-para-promover-campanha-de-incentivo-a-vacinacao. Accessed on: jun 2023.
41. Fundação Oswaldo Cruz, FIOCRUZ. Ministério da Saúde lança Movimento Nacional pela Vacinação [Internet]. 2023; 27 fev. Available from: https://www.fiocruzbrasilia.fiocruz.br/ministerio-da-saude-lanca-movimento-nacional-pela-vacinacao/. Accessed on: jun 2023.
42. Brasil, Ministério da Saúde. Cobertura Vacinal – Vacinação do Calendário Nacional [Internet]. Available from: https://infoms.saude.gov.br/extensions/SEIDIGI_DEMAS_VACINACAO_CALENDARIO_NACIONAL_MENU_COBERTURA/SEIDIGI_DEMAS_VACINACAO_CALENDARIO_NACIONAL_MENU_COBERTURA.html. Accessed on: Sep 15 2024.
43. Khawaja UA, Franch T, Pedersini P, Tovani-Palone MR. Declining rates of global routine vaccination coverage amidst the COVID-19 syndemic: a serious public health concern. Einstein (São Paulo). 2021;19. doi: 10.31744/einstein_journal/2021ED6552.
44. World Health Organization. Immunization coverage [Internet]. 2024; 15 jul. Available from: https://www.who.int/news-room/fact-sheets/detail/immunization-coverage. Accessed on: May 16 2025.
45. Organização Pan-Americana da Saúde, OPAS. Níveis mundiais de imunização estagnaram em 2023, deixando muitas crianças desprotegidas [Internet]. 2024; 15 jul. Available from: https://www.paho.org/pt/noticias/15-7-2024-niveis-mundiais-imunizacao-estagnaram-em-2023-deixando-muitas-criancas. Accessed on: May 16 2025.
46. Dagovetz M, Momchilov K, Blank L, Khorsandi J, Rizzo A, Khabbache H, et al. Global COVID-19 vaccination challenges: Inequity of access and vaccine hesitancy. J Med Surg Public Health. 2025(6):100197.

47. Nyachoti DO, Fwelo P, Springer AE, Kelder SH. Association between Gross National Income per capita and COVID-19 vaccination coverage: a global ecological study. BMC Public Health. 2023;23:2415.
48. Al-kassab-Córdova A, Mendez-Guerra C, Silva-Perez C, Herrera-Añazco P, Benites-Zapata VA. Inequalities in COVID-19 vaccination coverage in Peru: An ecological study. Public Health Pract. 2023;5:100384.
49. Souza LEPF, Buss PM. Global challenges for equitable access to COVID-19 vaccination. Cad Saúde Pública. 2021 Sep 22;37(9):e00056521.
50. Chen Z, Zheng W, Wu Q, Chen X, Peng C, Tian Y, et al. Global diversity of policy, coverage, and demand of COVID-19 vaccines: a descriptive study. BMC Med. 2022;20:130.
51. Nunes L. Panorama IEPS - Instituto de Estudos para Políticas de Saúde. Cobertura Vacinal no Brasil 2020. 2021; maio. Available from: https://ieps.org.br/wp-content/uploads/2021/05/Panorama_IEPS_01.pdf. Accessed on: Sep 15 2025.

No conflicts of interest declared concerning the publication of this article.

Corresponding author:
Denise Salotti Augusto Pizani
E-mail: denisesalottiaugusto@gmail.com