

# Analysis of vaccination coverage during the COVID-19 pandemic in Vitória, Brazil

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## Abstract

**Introduction:** with the current situation of measles outbreak in Brazil and the sharp drop in immunization coverage nationwide, it is necessary to think about ways to intervene in the face of so many difficulties, since the expansion of immunization coverage is the most effective and safe for the control of infectious diseases.

**Objective:** to analyze vaccine coverage of two National Campaigns during the COVID-19 pandemic in Vitória/ES.

**Methods:** a descriptive experience report on the implementation of an intervention plan to expand vaccination coverage of two National Vaccination Campaigns in 2020 in a Family Health Unit (FHU) during the Curricular Internship I (EC-I). It was based on the Situational Strategic Planning. Descriptive and bivariate statistical analyzes were performed.

**Results:** there was an increase of 5.79 times in the vaccination coverage of the National Measles Vaccination Campaign 2020 in the territory, from 0.86% (vaccination coverage of the triple viral before the start of EC-I) to 4.98% at the end of EC-I ( $p = 0.438$ ). When comparing the vaccination coverage of the National Multivaccination Campaign 2020 of immunobiologicals administered before and after the EC-I period at the FHU, we observed that there was a statistically significant difference ( $p = 0.0049$ ).

**Conclusion:** the proposed and implemented intervention plan had a positive outcome on the FHU, as the vaccination coverage of the two campaigns were expanded, despite all the challenges of the pandemic.

**Keywords:** Coronavirus infections, prevention & control, vaccine preventable diseases, vaccine coverage.

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## Authors summary

### Why was this study done?

With the current situation of measles outbreak in Brazil, in addition to the sharp drop in immunization coverage nationwide and in the state of Espírito Santo, due to the COVID-19 pandemic; it was necessary to think about ways to intervene in face of so many challenges, understanding that expanding immunization coverage is the most effective and safe way to control infectious and contagious diseases.

### What did the researchers do and find?

A descriptive experience report on the implementation of an intervention plan to expand vaccination coverage of two National Vaccination Campaigns in 2020 in a Family Health Unit (FHU) during the Curricular Internship I (EC-I). The results were based on epidemiological bulletins and on the Immunization Information System and the Municipal Information System – Rede Bem Estar. There was an increase in the vaccination coverage of the 2020 National Measles Vaccination Campaign, as well as a significant difference in the expansion of vaccination coverage of the 2020 National Multivaccination Campaign in the Family Health Strategy (FHS) São Cristóvão, Vitória, ES, Brazil.

### What do these findings mean?

The proposed and implemented intervention plan had a positive effect on the FHS São Cristóvão, Vitória, ES, Brazil, since the vaccination coverage of the two Campaigns was significantly expanded, in spite of all challenges of the COVID-19 pandemic. The intervention plan facilitated the management and organization of the work process, as well as the improvement of FHS indicators. It confirms the importance of teaching-service-community integration within the Brazilian Public Health System. These indicators are important to determine the strategies to be carried out by the National Immunization Program and the Health Surveillance at the municipal level.

## INTRODUCTION

Immunization is the most relevant cost-effective intervention for the global control of infectious diseases, through which it is possible to promote the reduction of mortality and the incidence of preventable diseases<sup>1,2</sup>. With the creation of the Brazilian Public Health System (SUS) in 1988, within the scope of the Federal Constitution, the way of thinking about health in Brazil, as well as the ways of acting in relation to immunization, were recycled. In 1973, the National Immunization Program (PNI) was formulated, which emerged as a form of organization to coordinate actions related to immunization in the country<sup>1,3</sup>.

In 2010, the Information System of the National Immunization Program (SIPNI) was implemented, allowing access to the vaccination record of each individual within the national territory, thus reducing locoregional barriers. The system allows the inspection of several indicators, such as doses received by each individual, post-vaccination adverse effects, and information regarding vaccination coverage<sup>4</sup>.

In recent years, the PNI has identified a drop in vaccination coverage<sup>5</sup>. The determinants and requirements associated with this low vaccination coverage are mainly linked to misinformation and users' lack of interest in immunization<sup>5,6</sup>. Added to that, there are the recent threats of SUS dismantling, the technical-operational aspects of the SIPNI, as well as the sociocultural aspects interfering with the acceptance of vaccination, the growing anti-vaccination movements worldwide, which are being strengthened with the increase in the spread of fake news shared especially on social media<sup>7</sup>.

Aiming at increasing vaccination coverage, the Ministry of Health announced two important campaigns in 2020. On March 23, the National Measles Vaccination Campaign began for people aged 20 to 49 years, with the objective of applying an Measles, Mumps, and Rubella (MMR) vaccine booster dose in adults of this age group. According to the regular vaccination schedule established by the Ministry of Health, MMR vaccine shall be applied as follows: one dose of the vaccine at 12 months; a dose

of MMRV at 15 months; two doses between 20 and 29 years, and one dose of the same vaccine between 30 and 49 years of age<sup>8</sup>.

Since 1968, measles has been a mandatory notification condition. To achieve the eradication of this disease, Brazil implemented, in 1992, a national plan for the elimination of measles, and the intensification of continued vaccination actions that same year led to a great reduction and control of the contagion. In 2015, with these actions established, measles transmission was eliminated, and in 2016 the country received the disease eradication certificate<sup>9</sup>. However, in recent years, there has been a return of circulation of the virus in the country, revealing a major problem of Public Health, as measles is a viral disease with a high rate of contagion and one of the main causes of childhood morbidity and mortality in individuals under 5 years of age<sup>10</sup>.

In 2017, in Venezuela, there was an outbreak of the disease and, due to the geographical proximity to the northern region of Brazil, and the political and economic situation experienced by the country, there was a migratory movement that triggered the return of the circulation of the virus in the Brazilian territory. In 2018, in the state of Roraima, the first confirmed case of an unvaccinated Venezuelan child was notified, starting a chain of transmission and dissemination throughout the territory<sup>11</sup>. Until October 2019, there were 49,613 suspected cases in Brazil, 10,429 of which were confirmed<sup>12</sup>.

On October 5, the National Multivaccination Campaign for children and adolescents under 15 years of age began, based on the regular vaccination schedule established, to expand vaccination coverage in times of pandemic of the new coronavirus<sup>10</sup>. In 2020, with the COVID-19 pandemic caused by the new coronavirus, in-person attendance at health services dropped dramatically in many countries, including child vaccination and that for the adult and elderly population, due to social distancing measures to mitigate virus transmission<sup>13-19</sup>.

Efforts to contain the COVID-19 pandemic, which involve telehealth practices and the use of other

technologies to continue home health care, greatly affected vaccination actions, which require people to go to the health service facilities<sup>13</sup>. Parents' concern to expose children to SARS-CoV-2 when taking them to health services for vaccination also contributed to the decline in vaccination coverage in the year 2020<sup>13,15-18</sup>. A recent risk-benefit study in African countries showed that deaths preventable by routine vaccination outweigh the excess risk of death from COVID-19 associated with attendance at the health service for vaccination, highlighting the need for efforts to increase vaccine coverage at this time<sup>13</sup>.

On March 26, 2020, the WHO and the Pan American Health Organization (PAHO) published recommendations on vaccination during the COVID-19 pandemic. The measures considered three scenarios of availability of health services and included the temporary suspension of mass vaccination campaigns during this period. It was recommended that routine vaccination be maintained in places where essential health services had the preserved operational capacity regarding human resources and supply of vaccines, respecting physical distancing and other measures to control the transmission of Sars-CoV-2<sup>20,21</sup>.

In Brazil, there was a recommendation to suspend routine immunization in the first 15 days after the start of the influenza vaccination campaign, a period dedicated to elderly groups and health professionals, which, although valid for the protection of the elderly, caused concern on the part of Brazilian medical societies<sup>22</sup>. Taking the current situation of measles in Brazil into account, as well as the sharp drop in immunization coverage nationwide, it is necessary to think about ways to intervene in face of so many difficulties, understanding that expanded immunization coverage is the most effective and safe way to control infectious diseases, to promote the reduction of mortality, and the incidence of preventable diseases.

Thus, the objective of this study is to analyze vaccine coverage of two National Campaigns during the COVID-19 pandemic in Vitória/ES.

## METHODS

A descriptive experience report was carried out on the implementation of an intervention plan to expand vaccination coverage of two National Vaccination Campaigns in 2020 in a Family Health Unit (FHU) during the Curricular Internship I (EC-I). It was based on the Situational Strategic Planning

Municipal Health Department of Vitória has a computerized system called "Rede Bem Estar", which helps monitoring the citizens' health, since health information related to these users is recorded in a single, electronic medical record. This system registers all families in the area covered by each territory in the capital. The study was carried out at the Family Health Strategy (FHS) São Cristóvão - opened in December 2012, which serves residents of the neighborhoods Tabuazeiro and São Cristóvão, and a small portion of residents from the neighborhood Maruípe, in the city of Vitória, ES, Brazil. According to "Rede Bem Estar", the FHS São Cristóvão had 4056 registered families, totaling 13,077 people in 2020.

Data collection procedures took place in the second half of 2020. The group of researchers consisted of six nursing students from the Federal University of Espírito Santo (UFES), the manager of the FHS, three specialist nurses in Public Health, and professors of the Public Health from UFES.

The intervention plan consisted of prior scheduling and vaccination of individuals in the city commerce – all registered in the territory covered by the FHS and registered in Rede Bem Estar. In the period between 09/29/2020 and 10/30/2020, the researchers in this study actively sought users to expand vaccine coverage with a focus on commerce in the territory.

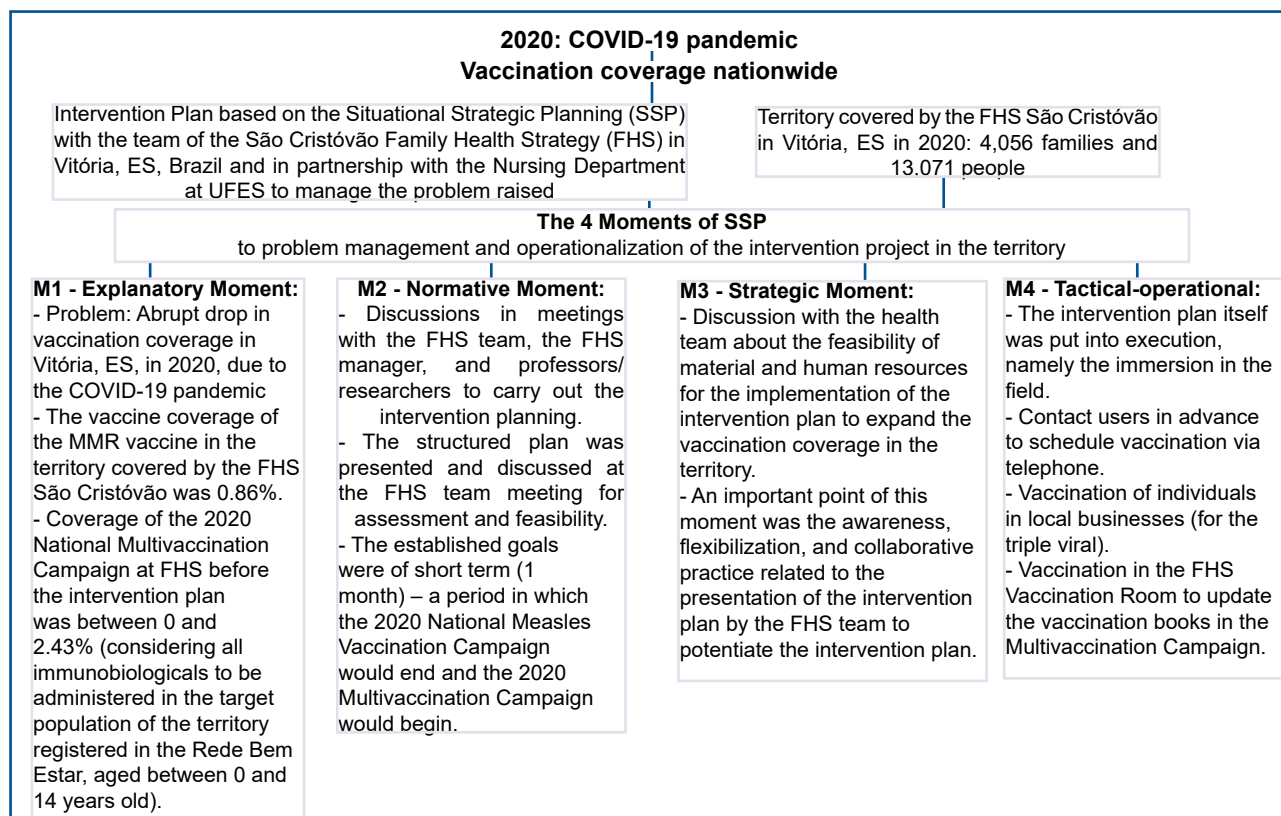
Before going to the stores to give the vaccines, the researcher responsible for the Vaccine Room at the FHS unit contacted retailers via telephone to schedule and program vaccination. Following vaccination, the information was registered by the researchers at Rede Bem Estar. Information on the vaccination status of the population in the territory covered by the FHS São Cristóvão in the period from March to October 2020 was collected from the Rede Bem Estar Information System at the FHS. The vaccine coverage, according to the doses received and to whether they were administered at the recommended age, was analyzed, following the guidelines of the National Immunization Program. The number of vaccine doses applied monthly from March to October 2020 was also evaluated and a comparison between the beginning and end of the campaign was performed.

For the feasibility of the intervention plan, the Situational Strategic Planning (SSP)<sup>23</sup> was used as a theoretical framework. At the first moment of SSP (explanatory moment), there was an abrupt drop in relation to vaccination coverage in 2020, due to the new coronavirus pandemic.

In the second moment of the SSP (normative moment), after identifying the problem with the health team and the nurse preceptors, the intervention plan was made with the health team and researchers. The structured plan was presented and discussed at the team meeting for assessment and feasibility. The established goals were of short term (1 month) – period in which the 2020 National Measles Vaccination Campaign would end and the 2020 Multivaccination Campaign would begin.

In the third moment of the SSP (strategic moment), the team discussed the operationalization of material and human resources for the implementation of the intervention plan to expand vaccination coverage in the territory. An important point of this moment was the awareness, flexibilization, and collaborative practice related to the presentation of the intervention plan by the FHS health team. Therefore, all notes by each member of the team were considered, to enhance the intervention plan. In the fourth moment of SSP (tactical-operational moment), the intervention plan was put into effect, including immersion in the field to vaccinate individuals in the stores in the territory (figure 1).

Authorization was obtained from the Municipal Health Department of Vitória/ES, as well as from the Direction of the FHS São Cristóvão for the collection of secondary data via Rede Bem Estar. It should be noted



**Figure 1:** Research flowchart according to the four moments of Situational Strategic Planning.

that the present study involved only the description and analysis of secondary data collected from the Information System of Rede Bem Estar. In particular, no information with individual identification was obtained for this study. Therefore, being in line with Resolution No. 510/2016, of April 7, 2016, of the National Health Council, this study was neither registered nor evaluated by the Research Ethics Committee/National Research Ethics Committee (CEP/CONEP) system.

Descriptive statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS®) version 20.0. Data were presented by absolute frequencies and percentages. Student's t test was used to compare vaccination coverage before and after the intervention plan. The significance level adopted was 5% ( $p < 0.05$ ).

## RESULTS

For the 2020 National Measles Vaccination Campaign, the total number of MMR vaccines administered and analyzed was 393. Table 1 shows the absolute frequencies related to the variables age, MMR vaccine dose, manufacturer, place of application, and vaccine schedule.

Regarding the Multivaccination Campaign, 794 vaccines were administered and analyzed. Table 2 shows the absolute frequencies related to the variables age, dose of the different vaccines received, immunobiological, manufacturer, site of administration, route of administration, and vaccination schedule.

Table 3 shows the characterization and quantification of vaccination coverage achieved in the 2020 National Measles Vaccination Campaign at the Family Health Strategy São Cristóvão during the study period.

**Table 1:** Characterization of the study population according to age, dose of the MMR vaccine, manufacturer, place of application, and vaccination schedule, during the National Measles Vaccine Campaign from March to October 2020. Vitória, ES, Brazil.

Variables	n	%
Age		
0 months - 1 year	58	14.75
2 years - 11 years	2	0.50
12 years - 22 years	46	11.70
23 years - 33 years	109	27.73
34 years - 44 years	111	28.24
45 years - 55 years	57	14.50
56 years - 60 years	10	2.54
Vaccine dose		
1st dose	149	37.91
2nd dose	36	9.16
3rd dose	1	0.25
Campaign dose	207	52.67
Manufacturer		
Fundação Oswaldo Cruz	126	32.06
Serum Institute of India	267	67.93
Site of administration		
Left deltoid	384	97.70
Right deltoid	8	2.05
Left thigh vastus lateralis	1	0.25
Vaccination schedule		
Updated	380	96.70
Delayed	13	3.30



**Table 2:** Characterization of the study population according to age, dose of different vaccines received, immunobiological, manufacturer, site of administration, route of administration, and vaccination schedule, during the 2020 Multivaccination Campaign in October 2020. Vitória, ES, Brazil.

Variables	n	%	Variables	n	%
Age			Human Rotavirus	11	1.38
0 months - 3 months	21	2.64	Varicella	47	5.91
4 months - 7 months	74	9.31	Manufacturer		
8 months -11 months	25	3.14	Biological	4	0.50
1 year - 5 years	571	71.91	Butantan	110	13.86
6 years - -10 years	37	4.65	Fiocruz	440	55.42
11 years - 14 years	66	8.35	Fundação Ezequiel Dias	41	5.17
Vaccine dose			Serum Institute of India	87	10.96
1st dose	123	15.49	Glaxosmithkline Brazil	18	2.27
2nd dose	136	17.13	Green Cross - Pharmaceutical	15	1.89
3rd dose	20	2.52	BM Corp.		
Campaign dose	285	35.90	Pfizer Laboratories	19	2.39
Booster	230	28.96	Lg Chemical Investment Ltd	5	0.62
Immunobiological			Merck Sharp E Dohme	32	4.03
Oral Polio vaccine	291	36.65	Farmaceutica Ltda/Go		
Inactivated polio vaccine	21	2.65	Panacea Biotec Ltd	23	2.89
DPT/HB/Hib	23	2.89	Site of administration		
Td	4	0.51	Ignored	306	38.54
Yellow fever	64	8.06	Right deltoid	152	19.15
Pediatric Hepatitis A	17	2.15	Left deltoid	136	17.13
Hepatitis B	5	0.62	Right thigh vastus lateralis	101	12.72
Quadrivalent HPV	41	5.17	Left thigh vastus lateralis	99	12.46
Trivalent Influenza	52	6.55	Route of administration		
Meningococcal ACWY	36	4.54	Ignored	1	0.12
Meningococcal C conjugate	41	5.17	Oral	302	38.03
Pneumococcal 10V	33	4.16	Subcutaneous	160	20.16
MMRV	1	0.12	Intramuscular	331	41.69
dTpa	54	6.80	Vaccination schedule		
MMR	53	6.67	Updated	687	86.53
			Delayed	107	13.47

**Table 3:** Vaccination Coverage of the 2020 National Measles Vaccination Campaign at the Family Health Strategy São Cristóvão, Vitória, ES, Brazil.

Immunobiological	Vaccination coverage before the intervention plan			Vaccination coverage after the intervention plan			Increased coverage
	n*	%	N**	n*	%	N**	
MMR	52	0.86	6.025	300	4.98	6.025	579
p-value***	p=0.438						

\*n= population of the vaccinated territory; \*\*N= target population of the territory of 6,025 individuals registered at Rede Bem Estar, aged between 20 and 49 years old to be vaccinated. \*\*\*p-value= based on student's t-test.

Table 4 shows in details the characterization and quantification of vaccination coverage achieved in the 2020 National Measles Vaccination Campaign at the Family Health Strategy São Cristóvão before and after the intervention plan.

**Table 4:** Vaccination Coverage of the 2020 National Measles Vaccination Campaign at the Family Health Strategy São Cristóvão, Vitória, ES, Brazil.

Immunobiological	Vaccination coverage before the intervention plan			Vaccination coverage after the intervention plan			Increased coverage
	n*	%	N**	n*	%	N**	%
Hepatitis B	1	0.04	2.306	6	0.26	2.306	650
Inactivated Polio Vaccine - IPV	56	2.43	2.306	32	1.39	2.306	57
Oral Polio Vaccine - OPV	22	0.95	2.306	76	3.29	2.306	346
Human Rotavirus	32	1.39	2.306	17	0.74	2.306	53
Pentavalent (diphtheria, tetanus, pertussis, hepatitis B and infections caused by Haemophilus influenzae B)	58	2.50	2.306	35	1.50	2.306	60
10-valent Pneumococcal (conjugated)	56	2.43	2.306	41	1.78	2.306	73
Meningococcal C (conjugate)	49	2.12	2.306	51	2.21	2.306	104
Yellow fever	29	1.26	2.306	67	2.90	2.306	230
MMR (measles, mumps and rubella)	37	1.60	2.306	61	2.64	2.306	165
MMRV (measles, mumps, rubella and varicella)	0	0.00	2.306	1	0.04	2.306	100
Pediatric Hepatitis A	17	0.74	2.306	21	0.91	2.306	122
Triple Bacterial - DPT (diphtheria, pertussis, and tetanus)	38	1.65	2.306	63	2.73	2.306	165
Adult double - Td	3	0.13	2.306	5	0.22	2.306	169
Attenuated Varicella	34	1.47	2.306	52	2.25	2.306	153
Quadrivalent HPV	23	1.00	2.306	43	1.86	2.306	186
Trivalent Influenza	0	0.00	2.306	60	2.60	2.306	650
Meningococcal ACWY	0	0.00	2.306	36	1.56	2.306	390
p-value***	p=0.049						

\*n= population of the vaccinated territory; \*\*N= target population of the territory of 2,306 individuals registered at Rede Bem Estar, aged between 0 and 14 years old to be vaccinated; \*\*\*p-value= based on student's t-test.

## DISCUSSION

The Brazilian vaccination schedule in the territory covered by the Family Health Strategy (FHS) São Cristóvão in the city of Vitória, ES, Brazil, was behind schedule in relation to the vaccination coverage defined by the Brazilian Ministry of Health (MS). During the period comprising the beginning of the 2020 National Measles Vaccination Campaign, the vaccine coverage of the MMR vaccine in the territory covered by the FHS São Cristóvão was of 0.86% vaccinated. With the implementation of the intervention plan, this vaccination coverage reached 4.98%, with 300 individuals vaccinated. However, this difference was not statistically significant (p=0.438). Nevertheless, we found that coverage was 5.79 times greater after the intervention plan was carried out at FHS São Cristóvão.

There was also a percentage increase in the vaccination coverage of the 2020 National Multivaccination

Campaign, after an intervention plan, of the following immunobiologicals, in descending order: 650% of the hepatitis B vaccine; 346% of the oral polio vaccine; 186% of the quadrivalent HPV vaccine; 169% of the Td vaccine; 165% of both MMR vaccine and DPT vaccine; 153% of the attenuated varicella vaccine; 130% of the yellow fever vaccine; 122% of pediatric hepatitis A vaccine; 4% of meningococcal C vaccine. When comparing the vaccine coverage of the 2020 National Multivaccination Campaign of immunobiologicals administered before and after the intervention plan, we observed a statistically significant difference (p=0.0049).

The new coronavirus pandemic has challenged health systems around the world in providing essential services, including immunization programs, as routine vaccination and mass vaccination campaigns could contribute to the spread of COVID-19<sup>7,24</sup>. In fact, the

COVID-19 pandemic had a significant impact on vaccine coverage, leading to high risks of resurgence of vaccine-preventable diseases<sup>25</sup>.

The expansion of vaccination coverage is one of the contemporary challenges for ensuring the population's health. Vaccination should be compulsory, a citizen's duty, as the collective well-being is what is at stake when seeking to prevent diseases. Since the 1970s, vaccination of children and adolescents has been the most effective and cost-effective measure of preventive health in the world. The vaccine schedule with availability of vaccines was developed to be one of the most successful and cost-effective public health measures to prevent diseases and save lives. Since the last half of the 20th century, diseases that were once very common have become rare in the developed world, mainly due to generalized immunization<sup>26,27</sup>. Vaccination is a public health priority even in times of pandemic and shall be maintained, whenever possible, with the adoption of strategies adapted to local and regional realities. These strategies shall preserve health professionals', the community's and caregivers' safety, and comply with the rules of social distancing defined for each period of the pandemic<sup>28</sup>.

With the spread of the new coronavirus pandemic, measures such as social isolation, the use of masks, and an increase in hand hygiene were required<sup>20</sup>. While isolation and limited circulation of people reduce the spread of COVID-19, they also reduce the spread of other pathogens (Measles, Respiratory Syncytial Virus, and Influenza). However, the non-attendance of children, adults, and the elderly to health facilities to update the vaccination schedule can impact vaccination coverage and put everyone's health at risk, especially in light of the current Brazilian epidemiological situation of measles, yellow fever, and pertussis<sup>29</sup>.

The drop in the vaccination coverage is one of the main health problems faced by men. The COVID-19 pandemic has worsened this problem even further. Health professionals shall be aware and updated in what regards vaccination schedules of different population groups and risk groups. They shall spread knowledge about the importance of vaccines, fight false news and, above all, ensure that vaccination opportunities are not missed<sup>30-32</sup>.

According to an alert from UNICEF and WHO, due to COVID-19, more than 117 million children in 37 countries may not receive the measles vaccine. Measles vaccination campaigns have already been postponed in several countries, which increases the chance of outbreaks. Brazil remains with an outbreak of measles in the five regions of the federation. The North Region has five (71.4%) states with an outbreak, the Northeast Region six (66.7%), the Southeast Region three (75.0%), the South Region three (100.0%), and the Midwest region four (100.0%) states. In Brazil, within the epidemiological weeks 01 to 25 of 2020 (12/29/2019 to 06/20/2020), 11,405 measles cases were reported, 4,958 confirmed (43.5%), 4,740 (41.5%) were ruled out, 1,707 (15.0%) were under investigation. The states of Pará, Rio de Janeiro, São Paulo, Paraná, and Santa Catarina concentrate the largest number of confirmed measles cases, totaling 4,804 (96.9%) cases. Deaths from measles occurred in the

states of Pará (3, 60.0%), Rio de Janeiro (1, 20.0%) and São Paulo (1, 20.0%)<sup>8</sup>.

A recent ecological study that aimed to analyze immunization coverage and measles incidence in the Northern Region of Brazil, using secondary data on immunization coverage of Td vaccine, MMR and MMRV, and measles incidence in residents of the Northern Region States, Brazil, from 2010 to 2018, showed a reduction in vaccination coverage during the study period, not reaching the percentage recommended by the Ministry of Health, and an increase in the incidence of measles in the Northern Region of Brazil<sup>33</sup>.

The sharp drop in vaccine coverage, especially for children during the COVID-19 pandemic, was a phenomenon experienced by several countries in various regions of the world<sup>15,18</sup>. In the USA, a considerable decline in the vaccination coverage of children was found, starting in the week after the declaration of COVID-19 as a pandemic by the World Health Organization on March 11, 2020, being greater among children under two years of age<sup>17</sup>. Particularly in the State of Michigan, in the United States, there was a decrease in vaccination coverage and a delay in all age groups analyzed when compared to the historical series of previous years. Coverage for measles was 70.8%<sup>14</sup>.

In England, three weeks after the introduction of social distancing (March 20, 2020), there was a 19.8% drop in doses of measles-mumps-rubella vaccine, compared to the same period in 2019<sup>16</sup>. In Michigan (USA), the completeness of the vaccination schedule for children at five months of age dropped from 67.0% to 49.7% in May 2020. At 16 months, it was found that measles vaccine coverage dropped from 76.1% to 70.9%<sup>16</sup>. In Indonesia, where immunization takes place in schools, an important drop in coverage of the basic vaccination scheme was estimated after the closing of schools in March 2020<sup>19</sup>. Moreover, this impact is much more significant in families of unfavorable socioeconomic conditions, as well as those living in situations of vulnerability<sup>18</sup>.

There are several factors related to the drop in vaccine coverage. Among them, we can list the main ones, such as the population's lack of perceptions of the risk of vaccine-preventable diseases, changes in the data collection systems of the National Immunization Program (PNI), the increase in the number of available vaccines, and updates on the recommendations by the Ministry of Health. The lack of education and training of professionals to work in vaccine rooms, the opening hours of vaccination sites, the momentary shortages for some immunobiologicals, the emergence of the anti-vaccination movement and fake-news have also contributed to the drop in the population vaccination coverage<sup>25</sup>.

The WHO recognizes this weakness and recommends efforts to ensure high vaccine coverage, seeking herd immunity for vaccine-preventable diseases, so that immunization programs adopt innovative measures<sup>20,21</sup>. Vaccination strategies in vehicles, at home, or in specific rooms well separated from other clinical care locations could be used, as well as the identification of absentees and recruitment for vaccination with the aid of computerized immunization records<sup>14-18</sup>.

Furthermore, safe strategies shall be developed to allow the maintenance of routine vaccination. Among them are knowledge of local epidemiology on vaccine-preventable diseases. It is also necessary to know how the circulation of COVID-19 is (transmissibility, number of new cases, number of deaths, number of hospital admissions, use of intensive care beds), what the demographic data and the availability of vaccines and supplies are, and the personnel capacity and structure of the vaccination service<sup>28,34-36</sup>.

Each local manager shall define the strategy to maintain immunization activities in accordance with the COVID-19 transmission rates in their area of residence. It is imperative that Primary Health Care is strengthened with investments and inputs for the active search and vaccination in the territories, especially for people with risk factors or the vulnerable ones. The surveillance system for vaccine-preventable diseases shall receive investments in inputs and personnel to detect cases early and track them when necessary<sup>37-43</sup>.

It should be noted that the health care network was greatly harmed by COVID-19<sup>38,43</sup>, both due to the health professionals who fell ill and continue being infected by the virus, and the difficulties faced with restrictions on urban mobility and the closing of some units. An active search and follow-up of people who were not vaccinated is required to update their vaccination schedule. When the vaccine capacity is limited, priority shall be given to risk groups, children under 5 years of age, pregnant women, and people with comorbidities. Priority becomes more important in institutionalized people and in areas of difficult access. When there is a spontaneous demand by the population in visits to clinics, hospitals, or through family health, it is essential to encourage vaccination in view of this opportunity<sup>31</sup>.

In health services, there shall be a change in people the inflows and outflows, changes in the routines of the health professionals involved, scheduling to avoid overcrowding, appointments for people from risk groups, and staff hiring to increase vaccine supply. Vaccination of residents of nursing homes, prisons, long-stay institutions of high or medium complexity, and companies with essential service workers/health professionals, among others, shall also be encouraged<sup>28</sup>.

Regarding the organization of health services at the time of vaccination, a vaccination waiting place in an outdoor and open place shall be found. A 2-meter distance between the individuals in the waiting line is essential. There needs to be a professional at the entry for screening of symptoms related to COVID-19 and rescheduling of vaccination. Gloves shall not be used at the time of vaccination, it is essential to clean the hands correctly with soap and water or 70% alcohol hand sanitizer gel. The use of masks is recommended to reduce transmission. A uniform shall be used in the work environment, instead of clothes used for transport to work. Wearing closed shoes, no accessories, fastening long hair, not using phones during the service and frequently cleaning them are other important actions<sup>29</sup>.

The dissemination of information about the importance of maintaining high rates of vaccination coverage for the population is essential. The training of credible information multipliers related to health and immunizations and the mobilization of community leaders strengthen the vaccine goals. The message that vaccines are safe, service at health care units, information about service hours shall be part of advertising campaigns on the national network. Vaccination is a priority in public health and should be maintained, whenever possible, with the adoption of strategies adapted to local realities and focused on the territory. These strategies shall preserve health professionals', the community's and caregivers' safety, and comply with the rules of social distancing defined for each period of the pandemic. There shall be a fight to re-establish adequate vaccination coverage levels for the entire population, especially for the most vulnerable<sup>28</sup>.

The proposed and implemented intervention plan had a positive effect on the FHS São Cristóvão, since the vaccination coverage of the two Campaigns was significantly expanded, despite all the challenges of the new coronavirus pandemic. This confirms that the intervention plan facilitated the management and organization of the work process, as well as the improvement of FHS indicators, based on the teaching-service-community integration within the Brazilian Public Health System. These indicators are important to determine the strategies to be carried out by the National Immunization Program and the Health Surveillance at the municipal level.

## ■ CONCLUSION

The proposed and implemented intervention plan had a positive outcome. During the study period, an increase in the vaccination coverage of the 2020 National Measles Vaccination Campaign and the 2020 National Multivaccination Campaign was observed in the territory covered by the FHS São Cristóvão in the city of Vitória, ES, Brazil. The vaccination coverage of the two Campaigns was significantly expanded, despite all challenges of the COVID-19 pandemic.

## Author contributions

LCLJ, participated in the conception and design of the study; data interpretation elaboration and critical review of the manuscript; approval of the final version of the manuscript; and has public responsibility for the content of the article. TMS, LBS, CLVD, IRD, NBM, TLCD participated in data collection and interpretation, drafting and critical review of the manuscript; approval of the final version of the manuscript. LCR, EAM, VRS and FMS participated in data interpretation and critical review of the manuscript; approval of the final version of the manuscript.



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## Resumo

**Introdução:** com a conjuntura atual do sarampo no Brasil, além da queda acentuada da cobertura vacinal em âmbito nacional, faz-se necessário pensar sobre as formas de intervir frente a tantos desafios, compreendendo que a ampliação da cobertura vacinal é a forma mais efetiva e segura para o controle de doenças infectocontagiosas.

**Objetivo:** analisar a cobertura vacinal de duas Campanhas Nacionais durante a pandemia de COVID-19 em Vitória/ES.

**Método:** relato de experiência descritivo, sobre a implementação de um plano de intervenção de ampliação de cobertura vacinal de duas Campanhas Nacionais de Vacinação em 2020 em uma Unidade de Saúde da Família (USF) durante a Disciplina de Estágio Curricular I (EC-I). O plano de intervenção foi alicerçado no Planejamento Estratégico Situacional. Análises estatísticas descritivas e bivariadas foram realizadas.

**Resultados:** houve um aumento de 5,79 vezes da cobertura vacinal da Campanha Nacional de Vacinação contra o Sarampo 2020, passando de 0,86% (em março de 2020) para 4,98% no final de outubro de 2020 ( $p=0,438$ ). Ao comparar a cobertura da Campanha Nacional Multivacinação 2020 dos imunobiológicos administrados antes e após o plano de intervenção, observamos que houve uma diferença estatisticamente significativa ( $p=0,0049$ ).

**Conclusão:** verificou-se um aumento nas coberturas vacinais da Campanha Nacional de Vacinação contra o Sarampo 2020 e da Campanha Nacional Multivacinação 2020. O plano de intervenção proposto e implementado surtiu efeito positivo na USF, pois, foi ampliado a cobertura vacinal das duas Campanhas, mesmo com todos os desafios da pandemia.

**Palavras-chave:** infecções por Coronavírus; prevenção & controle; doenças preveníveis por vacina; cobertura vacinal.

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