

# COVID-19 VACCINATION COVERAGE IN LONG-TERM INSTITUTIONS FOR THE ELDERLY

## COBERTURA VACINAL CONTRA COVID-19 EM INSTITUIÇÕES DE LONGA PERMANÊNCIA PARA IDOSOS

## COBERTURA VACUNAL CONTRA COVID-19 EN INSTITUCIONES DE LARGA ESTANCIA PARA PERSONAS MAYORES

Meirelayne Borges Duarte<sup>1</sup>  
Gabrielle Oliveira Silva<sup>2</sup>  
Rafaela Ferreira Schittini Barreto<sup>3</sup>  
Peter Lloyd-Sherlock<sup>4</sup>  
Helena Patáro de Oliveira Novaes<sup>5</sup>  
Mônica Hupsel Frank<sup>6</sup>  
Tânia Maria de Oliva Menezes<sup>7</sup>

**How to cite this article:** Duarte MB, Silva GO, Barreto RFS, Lloyd-Sherlock P, Novaes HPO, Frank MH, et al. COVID-19 vaccination coverage in long-term institutions for the elderly. Rev. baiana enferm. 2023;37:e47366.

**Objective:** to analyze vaccination coverage against COVID-19 in long-term care institutions for the elderly. **Method:** cross-sectional study with aggregated data provided by the Intersectoral Monitoring Commission of Long-Term Institutions of Bahia. We included the institutions identified in Salvador, Bahia, Brazil, with at least one elderly resident (60 years or older) who responded to the vaccination survey conducted between May and July 2021. **Results:** the sample consisted of 83 establishments, with a predominance of private (50.1%) and philanthropic (32.5%) institutions. Vaccination coverage for COVID-19 reached 94.7% of elderly residents and 75.2% of workers. **Conclusion:** the study shows high vaccination coverage in elderly residents of these institutions, but lower coverage among workers. Maximizing vaccination coverage among caregivers and residents is essential, due to the extreme vulnerability of the elderly population institutionalized to COVID-19.

**Descriptors:** COVID-19. Vaccination coverage. Aged. Institution of Long Stay for the Elderly. Caregivers.

**Objetivo:** analisar a cobertura vacinal contra COVID-19 em Instituições de Longa Permanência para idosos. **Método:** estudo transversal com dados agregados fornecidos pela Comissão Intersetorial de Acompanhamento das Instituições

Corresponding Author: Meirelayne Borges Duarte, meirelayne.duarte@unifacs.br

<sup>1</sup> Universidade Salvador. Salvador, BA, Brazil. <https://orcid.org/0000-0002-2744-1979>.

<sup>2</sup> Universidade Salvador. Salvador, BA, Brazil. <https://orcid.org/0000-0001-7528-4253>.

<sup>3</sup> Faculdade Santo Agostinho. Vitória da Conquista, BA, Brazil. <https://orcid.org/0000-0001-9200-2123>.

<sup>4</sup> University of East Anglia – Norwich, Reino Unido. <https://orcid.org/0000-0002-1367-0703>.

<sup>5</sup> Universidade Federal da Bahia. Salvador, BA, Brazil. <https://orcid.org/0000-0003-4872-0923>.

<sup>6</sup> Centro de Referência Estadual de Atenção à Saúde do Idoso. Salvador, BA, Brazil. <https://orcid.org/0000-0001-6141-8409>.

<sup>7</sup> Universidade Federal da Bahia. Salvador, BA, Brazil. <https://orcid.org/0000-0001-5819-0570>.

*de Longa Permanência da Bahia. Foram incluídas as instituições identificadas em Salvador, Bahia, Brasil, com pelo menos um residente idoso (60 ou mais anos) que responderam ao inquérito de vacinação realizado entre maio a julho de 2021. Resultados: a amostra foi composta por 83 estabelecimentos, com predomínio de instituições privadas (50,1%) e filantrópicas (32,5%). A cobertura vacinal da COVID-19 atingiu 94,7% dos idosos residentes e 75,2% dos trabalhadores. Conclusão: o estudo mostra alta cobertura vacinal em idosos residentes nestas instituições, porém, menor cobertura entre os trabalhadores. A maximização da cobertura vacinal entre os cuidadores e residentes é fundamental, devido à extrema vulnerabilidade da população idosa institucionalizada à COVID-19.*

*Descritores: COVID-19. Cobertura vacinal. Idoso. Instituição de Longa Permanência para Idosos. Cuidadores.*

*Objetivo: analizar la cobertura vacunal contra COVID-19 en Instituciones de Larga Permanencia para ancianos. Método: estudio transversal con datos agregados proporcionados por la Comisión Intersectorial de Seguimiento de las Instituciones de Larga Permanencia de Bahía. Se incluyeron las instituciones identificadas en Salvador, Bahía, Brasil, con al menos un residente de edad avanzada (60 o más años) que respondieron a la encuesta de vacunación realizada entre mayo y julio de 2021. Resultados: la muestra fue compuesta por 83 establecimientos, con predominio de instituciones privadas (50,1%) y filantrópicas (32,5%). La cobertura vacunal de COVID-19 alcanzó el 94,7% de los ancianos residentes y el 75,2% de los trabajadores. Conclusión: el estudio muestra alta cobertura vacunal en ancianos residentes en estas instituciones, sin embargo, menor cobertura entre los trabajadores. La maximización de la cobertura vacunal entre cuidadores y residentes es fundamental debido a la extrema vulnerabilidad de la población de edad avanzada institucionalizada a COVID-19.*

*Descriptores: COVID-19. Cobertura vacunal. Anciano. Institución de Larga Permanencia para Ancianos. Cuidadores.*

## Introduction

Long-term care institutions (LTIEs) are collective residences for people aged 60 years or older, with or without family support<sup>(1)</sup>, many of which are 80 years or older and/or functionally dependent. They are therefore vulnerable populations, with high risk of infection and adverse outcomes due to the collective environment, age and prevalent comorbidities<sup>(2-3)</sup>. Thus, these institutions needed to take special care to avoid the spread of COVID-19, including primary prevention measures, early recognition and isolation of cases, and become a priority in immunization plans<sup>(4)</sup>.

Once the COVID-19 vaccines were made available, the state of Bahia prepared the State Immunization Program<sup>(5)</sup>, based on the National Vaccination Plan<sup>(6)</sup>, whose administration of the vaccines is carried out by the municipal health departments. This defined four stages of implementation of vaccination for different populations, and in the first phase, in addition to health professionals, the residents of the LTIEs were prioritized, followed by people aged 75 years or more, and indigenous peoples of traditional and riverine communities<sup>(5-6)</sup>.

The vaccination against Covid-19 in the LTIEs of Bahia began in January 2021, involving a

two-dose scheme, with an interval of 30 days (CoronaVac vaccine). Unlike the community-dwelling elderly, whose vaccination was staggered according to age group (starting with those aged 90 years or older), vaccination was initially offered to all residents of the LTIEs, regardless of age, as well as caregivers employed in those facilities, administered *in loco*<sup>(6)</sup>.

Therefore, this study aims to analyze vaccine coverage against COVID-19 in LTIEs.

## Method

This is a cross-sectional study with data collected by the Intersectoral Commission for monitoring LTIEs in the State of Bahia, Brazil, which consented to the use of these aggregated data. The Commission's work identified all LTIEs in the state of Bahia, Brazil (n = 210), between April 2020 and July 2021, with the creation of a single list, which did not exist before the pandemic. In Salvador, the state capital, 87 LTIEs were identified<sup>(7)</sup>.

Salvador is the fourth largest city in Brazil, with an estimated population of 2,900,000 inhabitants and an Aging Index of 44.8 (number

of elderly people per 100 individuals under 15 years of age)<sup>(8)</sup>. Due to historical patterns of segregation and racial inequality, there is a greater concentration of the black population in the most vulnerable areas, while the white population predominates on the seafront, with better living conditions<sup>(9)</sup>. Salvador comprises 12 health districts (HD), with different demographic densities (3,041 to 25,817 inhabitants / km<sup>2</sup>) and different percentages of the elderly (6.3 to 15.7%)<sup>(10)</sup>.

This study included the LTIEs identified in the city of Salvador during the period of the COVID-19 pandemic, with at least one older resident (> 60 years), who responded to the vaccination survey, conducted from May to July/ 2021 (n = 85). Institutions were excluded where the number of people under 60 years of age exceeded that of 60 years of age or more (n = 2).

Aggregated data include the following variables: location of the LTIE (health district), type of LTIE funding (public, philanthropic, private, mixed, religious community); number of older residents; number of workers; number of residents and older workers vaccinated against COVID-19; number of residents and older workers who refused to receive the vaccine.

Descriptive statistical analysis was performed using measures of central tendency and dispersion for quantitative variables and frequency distribution for nominal qualitative variables.

For this research, the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) was used<sup>(11)</sup>. This study was approved by the Research Ethics Committee with Opinion 4,290,451, of September 21, 2020.

## Results

The sample consisted of 83 LTIEs located in Salvador, Bahia, with a predominance of private (50.1%) and philanthropic (32.5%) LTIEs. Only three institutions declared themselves public. The HD of Itapuã has the highest number of LTIEs in the municipality (n = 28), the vast majority being private institutions (85.7%). In contrast, in the HD with the second highest number of LTIEs, Itapagipe (n = 14), area poorer than Itapuã, more than half declared themselves philanthropic (57.1%). The HD of the Historic Center presented the third largest number of LTIEs (n = 9), where private institutions also predominated (77%). No LTIE was identified in the HD of Boca do Rio (Table 1).

**Table 1** - Distribution of LTIEs by health district and type of funding in Salvador, Bahia, Brazil – 2021. (N=83)

Health District (HD)	Private	Public	Philanthropic	Religious Community	Mixed	Total
Itapuã	24	1	1	1	1	28
Itapagipe	2	1	8	2	1	14
Centro Histórico	7	0	1	1	0	9
Barra/Rio Vermelho	3	1	1	2	0	7
Subúrbio Ferroviário	2	0	4	0	0	6
Brotas	1	0	4	0	1	6
Cabula	2	0	3	0	0	5
Liberdade	1	0	1	0	1	3
Pau da Lima	0	0	1	1	0	2
Cajazeiras	0	0	2	0	0	2
São Caetano/Valéria	0	0	1	0	0	1
Boca do Rio	0	0	0	0	0	0
Total	42	3	27	7	4	83

Source: Created by the authors.

There were 1,824 elderly residents in the LTIEs included in the research, with concentration in the HD of Itapuã and Itapagipe (22.7% and 20.3% of the total, respectively). These percentages do not maintain the difference between those observed in the distribution of LTIEs (Itapuã has twice the LTIEs in relation to Itapagipe). Although private LTIEs predominated in the

sample studied, the highest percentage of residents was observed in philanthropic LTIEs (40.9%). The HD analysis reveals differences in this distribution, with predominance of residents in private LTIEs in the HD of Itapuã and Centro Histórico (77.3% and 88.6%, respectively) and LTIEs with mixed financing (particular / philanthropic) in the HD of Brotas (47.5%) (Table 2).

**Table 2** - Distribution of elderly residents in LTIEs in Salvador by DS and type of financing. Salvador, Bahia, Brazil – 2021. (N=1824)

Health District (HD)	Private	Public	Philanthropic	Religious Community	Mixed	Total
Itapuã	321	55	12	17	10	415
Itapagipe	50	46	181	76	18	371
Centro Histórico	171	0	17	5	0	193
Barra/Rio Vermelho	33	24	8	8	0	73
Subúrbio Ferroviário	28	0	201	0	0	229
Brotas	22	0	114	0	123	259
Cabula	36	0	71	0	0	107
Liberdade	10	0	9	0	18	37
Pau da Lima	0	0	54	6	0	60
Cajazeiras	0	0	60	0	0	60
São Caetano/Valéria	0	0	20	0	0	20
Boca do Rio	0	0	0	0	0	0
Total	671	125	747	112	169	1824

Source: Created by the authors.

The total number of elderly people per LTIE ranged from 2 to 123 (mean = 44 + 20.3). More than 60% are small institutions, housing less than

20 elderly people per LTIE. LTIEs with more than 40 older adults represent less than 15% of the sample (Table 3).

**Table 3** – Distribution of LTIEs according to the number of elderly residents (simple, relative and cumulative frequency). Salvador, Bahia, Brazil – 2021. (N=83)

Total of the elderly per LTIE	LTIEs (n)	%	cumulative %
<20 idosos	52	62,7%	62,7%
20 a 39 idosos	20	24,1%	86,7%
40 a 59 idosos	8	9,6%	96,4%
60 a 79 idosos	1	1,2%	97,6%
89 a 99 idosos	0	0,0%	97,6%
100 ou mais idosos	2	2,4%	100,0%

Source: Created by the authors.

Vaccination coverage against COVID-19 reached 94.7% of elderly residents in LTIEs. Nine LTIEs (10.8%) did not reach 80% vaccination

coverage, without evidence of association with the type of funding. These nine LTIEs are units with fewer elderly, ranging from 6 to 23

(mean = 15 + 5.3 elderly people per LTIE), so that each unvaccinated individual has a strong impact on the percentage of vaccination coverage. The

administration of the vaccine was refused by 14 elderly residents of LTIEs (0.8%). (Table 4)

**Table 4** - Vaccination coverage against COVID-19 in elderly residents and employees of LTIEs. Salvador, Bahia, Brazil – 2021. (N=83)

	LTIEs (n)	Vaccination coverage against COVID_19 in the elderly		Vaccination coverage against COVID_19 in the workers	
		>90%	<80%	> 80%	<60%
Privado	42	33	4	17	15
Público	3	3	0	2	1
Filantrópico	27	23	3	15	8
Comunidade Religiosa	7	5	1	3	3
Misto	4	2	1	1	3
Total	83	66	9	38	30

Source: Created by the authors.

Two LTIEs did not provide information about their team. In the others (n=81), the total number of workers was 1,534, ranging from 3 to 125 employees per LTIE (mean = 37 + 29.2). Vaccination coverage of COVID-19 reached 75.2% of workers. More than half of the LTIEs did not reach the vaccination coverage of 80% of workers and more than 1/3 did not reach 60%. No evidence suggests an association between vaccination coverage and type of funding. Eleven workers refused vaccination (0.7%). (Table 3).

## Discussion

The vaccination coverage against COVID-19 of the institutionalized elderly was very high in the LTIEs studied, reaching almost all of them. This reflects the measures indicated in the National Plan for the Operationalization of Vaccination effectively adopted by the Department of Health of Bahia and the City Bureau of Salvador, including vaccination on the spot as soon as possible, starting in January 2021<sup>(5-6)</sup>. This was a fundamental strategy to reduce outbreaks of COVID-19 in Brazilian LTIEs, as demonstrated by the Department of Health of the State of Paraná, through the analysis of the Epidemiological Bulletins published on January 20 and May 9, 2021, with evidence of a reduction

in the percentage of hospitalized elderly and the median age of death<sup>(12)</sup>. Certainly, the vaccination of institutionalized older adults contributed to the decline in the incidence of COVID-19 in LTIEs, as well as other factors including the continuous use of screening, testing and recommended infection prevention practices<sup>(13)</sup>.

In contrast, the vaccination coverage of the employees of the LTIEs was much lower, reaching less than 80%. Although LTIEs workers were not explicitly included in the first phase of vaccination, according to the COVID-19 National Vaccination Plan, the state of Bahia decided to vaccinate the LTIEs workers at the time of vaccination of the institutionalized elderly<sup>(5-6)</sup>. The lower vaccination coverage among workers possibly reflects the precariousness of labor relations, due to the lack of regulation of the elderly caregiver profession in Brazil, in addition to the services provided by volunteers, mainly in the scenario of philanthropic LTIEs, which culminates in high employee turnover with temporary work<sup>(14)</sup>. In fact, LTIE workers are not classified as frontline health professionals in part because they are under the aegis of social assistance.

Some studies show that vaccination rates against COVID-19 among employees of LTIEs are unacceptably low, considerably below the

vaccination coverage of residents of LTIEs<sup>(15-16)</sup>. Employees of unvaccinated LTIEs present an imminent risk to vulnerable residents under their care. Low vaccination coverage among LTIEs teams can introduce COVID-19 into the facility and contribute to future outbreaks, especially in the presence of more transmissible variants. The maximization of vaccination coverage among LTIE employees and residents is fundamental, due to the extreme vulnerability of this population to COVID-19<sup>(15-16)</sup>.

The percentage of refusal of vaccination was low among residents and workers of LTIEs, despite unfounded fears spread by social networks in a scenario of ideological and partisan divergences in the current policy in Brazil<sup>(17)</sup>. In a single state survey in Indiana on the willingness of long-term care staff to receive a COVID-19 vaccine, only 45% of respondents indicated they would receive an approved COVID-19 vaccine, highlighting the importance of educating the team about the vaccine, to increase acceptance<sup>(18)</sup>.

As this is a study with secondary and aggregated data, one of its limitations is the lack of information on the reason for the non-vaccination of several workers of the LTIEs and some residents, considering the possibility of having been for new hires after vaccination, temporary contraindication due to health problems, lack of doses at the time of application, or absenteeism on the day of vaccination (in the case of workers).

Based on the information presented, half of the LTIEs are private institutions and only three are public institutions. Because it is a study with secondary data and the type of financing self-declared by the LTIE, it is necessary to consider that, even among philanthropic ones, there may be some for profit. Whether in the city of Salvador or throughout Brazil, there is a lack of government investments aimed at this growing population, as demonstrated in a national survey conducted in 2011 by the Institute of Applied Economic Research (IPEA - *Instituto de Pesquisa Econômica Aplicada*) which reveals that 71% of the municipalities did not have institutions for the elderly and, of these, less than 7%

come from public funding<sup>(19)</sup>. According to the survey, of the 3,294 LTIEs nationwide, 62.5% are philanthropic and only 6.6% are public establishments<sup>(20)</sup>. A recent study with 156 LTIEs from the metropolitan region of Belo Horizonte also showed predominance of private institutions (74.5%) and absence of public LTIEs<sup>(21)</sup>.

In addition, the present study showed a very unequal distribution of LTIEs among the sanitary districts of Salvador, with approximately one third of the LTIEs in Itapuã HD. With the lowest population density and the largest continental territorial extension among the sanitary districts of Salvador<sup>(10)</sup>, Itapuã was a fishing village, which until the 1970s served as a summer resort, with some local farms. After the urban revolution of the 70s, with easier access, this region also started to attract many enterprises<sup>(22)</sup>. All this can justify the greater concentration of LTIEs in this scenario, including the greater existence of large horizontal constructions in the region.

Attention is drawn to the predominance of private LTIEs in the HD of Itapuã. This reflects the best Living Conditions Indexes (LCI/WHO) presented by the coastal neighborhoods of Salvador (comprised by the HD of Barra/Rio Vermelho, Boca do Rio and Itapuã), where the white population is concentrated, high and urban infrastructure and services, contrasting with the “core” of the city, where a predominantly black and poor population lives in vulnerable areas, marked by the lack of infrastructure and precarious housing<sup>(9, 23)</sup>.

In the city of Salvador, the Aging Index (number of people aged 60 years or more for every 100 under 15 years) showed a large increase between the years 2005 to 2015. In the stratified analysis by health district, the highest Aging Indexes in 2015 were expressed in the HD of the Historic Center (107.7), Barra/Rio Vermelho (93.4) and Brotas (61.8)<sup>(24)</sup>. Similarly, in the present study, Brotas ranks third in number of residents in LTIEs. The same relationship was not found in other health districts, but it is known that several other factors determine the institutionalization of the elderly, as well as the location of the chosen LTIE, which does not always coincide with the

neighborhood of the previous residence of the elderly. In this sense, it would be important to consider the proximity between the institution and the residence of family members, since this is one of the strategies to minimize the impacts of institutionalization, enabling greater integration of the family in this scenario<sup>(25)</sup>.

The average number of elderly residents per Salvador LTIE (n= 44) was higher than that found in the study published in 2010, which revealed a contingent of approximately 84 thousand elderly people living in 3,295 Brazilian LTIEs, corresponding to the average of 25.5 elderly people per LTIE<sup>(20)</sup>. However, the average being affected by extreme values, it is observed that most LTIEs house numbers of elderly below the average indicated. It is necessary to consider the heterogeneity of Brazilian LTIEs in relation to the different socio-cultural contexts of each municipality, which influence health conditions, reasons that lead to the institutionalization of the elderly, as well as the availability of LTIEs.

In addition to the limitations of studies with aggregated data, more detailed information on vaccination logistics and other socioeconomic indicators by health district is lacking to allow a greater analysis of the results.

## Conclusion

The study shows high vaccination coverage against COVID-19 in elderly residents of LTIEs in Salvador/Bahia, however, lower coverage among workers in these units. The maximization of vaccination coverage among employees and residents of LTIEs is fundamental, due to the extreme vulnerability of elderly residents in these institutions to COVID-19. In addition, this study outlines a profile of the LTIEs of Salvador regarding the geographical distribution, type of financing and number of residents and workers. Thus, it is possible to compare such data with other Brazilian scenarios and other cities in low- and middle-income countries.

## Collaborations:

1 – conception and planning of the project: Meirelayne Borges Duarte, Rafaela Ferreira

Schittini Barreto, Gabrielle Oliveira Silva, Peter Lloyd-Sherlock, Helena Patáro de Oliveira Novaes, Tânia Maria de Oliva Menezes and Mônica Hupsel Frank;

2 – analysis and interpretation of data: Meirelayne Borges Duarte, Rafaela Ferreira Schittini Barreto, Gabrielle Oliveira Silva, Peter Lloyd-Sherlock, Helena Patáro de Oliveira Novaes, Tânia Maria de Oliva Menezes and Mônica Hupsel Frank;

3 – writing and/or critical review: Meirelayne Borges Duarte, Rafaela Ferreira Schittini Barreto, Gabrielle Oliveira Silva, Peter Lloyd-Sherlock, Helena Patáro de Oliveira Novaes, Tânia Maria de Oliva Menezes and Mônica Hupsel Frank;

4 – approval of the final version: Meirelayne Borges Duarte, Rafaela Ferreira Schittini Barreto, Gabrielle Oliveira Silva, Peter Lloyd-Sherlock, Helena Patáro de Oliveira Novaes, Tânia Maria de Oliva Menezes and Mônica Hupsel Frank.

## Conflicts of interest

There are no conflicts of interest.

## Funding sources

UKRI GCRF/Newton Fund Agile Response Fund (project reference: EP/V043110/1).

## Acknowledgements

To the Intersectoral Commission for Monitoring Long-Term Institutions for the Elderly in the State of Bahia and the directors of the institutions involved.

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Received: December 16, 2021

Approved: April 21, 2023

Published: August 2, 2023



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