DOI: 10.1590/1413-81232022279.05082022EN

Vaccine and smallpox vaccination in nineteenth century Bahia

Gilberto Hochman (https://orcid.org/0000-0001-7834-336X) [1]
Christiane Maria Cruz de Souza (https://orcid.org/0000-0001-9716-7891) [2]

Abstract *This article aims to discuss the perceptions and actions of public authorities regarding the process of introduction, production, conservation, distribution, and application of the smallpox vaccine; the emergence of institutions associated with the vaccine and vaccination; and its main obstacles in Bahia in the nineteenth century. The article emphasizes the local and regional dynamics of this process. It addresses the problem of smallpox in colonial Bahia, the arrival of the Jennerian vaccine, the diffusion of the vaccination method, the establishment of health institutions, and the disease control measures implemented as of 1808. In the context of the post-independence and Imperial Brazil, this article addresses smallpox outbreaks and discusses the problems related to vaccine and vaccination listed by the governors of the province of Bahia and local efforts to introduce the animal vaccine. This article is based on printed primary sources published in Bahia in the nineteenth century, as well as through dialogues with specialized literature.*

Key words *Public health, Epidemics, Smallpox, Brazil Empire, Medicine*

[1] Casa de Oswaldo Cruz, Fundação Oswaldo Cruz. Av. Brasil 4365, Centro de Documentação em História da Saúde, Manguinhos. 21040-900 Rio de Janeiro RJ Brasil. gilberto.hochman@fiocruz.br
[2] Instituto Federal de Educação, Ciência e Tecnologia da Bahia. Salvador BA Brasil.

Introduction

Smallpox is the only human disease eradicated by the combined action of national governments, bilateral and multinational agencies, and international health organizations. The last case of natural infection by the disease was identified in Somalia in 1978. Brazil, the last endemic country in the Americas by the end of the 1960's obtained the certification of smallpox eradication in August 1973, taking into consideration the absence of cases over two consecutive years after an intense vaccination campaign between 1969 and 1971. Smallpox was eradicated in Brazil and the world through the use of the vaccine, together with vaccination campaigns and epidemiological surveillance[1,2].

The history of the smallpox vaccine and smallpox vaccination harkens back to the beginning of the nineteenth century, a period which has been analyzed with an emphasis on the experience of Rio de Janeiro, and later São Paulo, cities that became political and economic centers in Brazil. However, considering the diversity and territorial extension of the country, this history contains local outlines and realities, a perspective that has been given renewed value in historiographic production. This article analyzes the adoption of the ~~anti-~~smallpox vaccine in a local context, more specifically in the city of Salvador and the state of Bahia, in the 1800s. Founded in 1549, Salvador, for three centuries, was a strategic city for the creation of Brazil's agroindustrial system and transatlantic trade. It was the capital of Brazil until 1763 and was the port which received the most enslaved Africans; it was also a center for receiving and distributing products from the colonial metropolis and from the countryside of the colony. The economic and political importance of the city during the colonial period continued throughout the Imperial period (1822-1889)[3,4].

At the Salvador harbor, people and products from several places around the country and from around the world were constantly arriving, as were the pathogens that caused disease. Sailors, settlers, travelers, and especially enslaved Africans arrived sick or even dying at the city's harbor. The high mortality index of Africans in the voyages from Africa to Bahia was the result of mistreatment, poor sanitary conditions aboard the slave ships, overcrowding, starvation, the cold aggravated by the lack of clothes, and the terrible quality of the water and food[5,6]. Among the diseases disseminated during the crossing of the Atlantic, smallpox proved to be one of the most devastating.

Until the end of the eighteenth century, the only measures to avoid the dissemination of communicable diseases in the colony was surveillance and quarantining of the vessels with sick people aboard. The smallpox vaccine, discovered by Edward Jenner in 1796, arrived in Bahia in the beginning of the nineteenth century and provides the starting point for this article, which goes until the beginning of the production of the "animal-based vaccine" in Brazil in 1887. The main objective of this article is to present the challenges in the prevention of smallpox in Bahia in the 1800s. Smallpox vaccine was the first large-scale medical intervention under the guise of public authorities, and the basis for the establishment of the first structures of public health, both locally and nationally, in nineteenth-century Brazil. The province of Bahia and the city of Salvador were centers of innovation in terms of public response to the disease. The core aim is to discuss the perceptions and actions of the public authorities in the process of production, conservation, distribution, and administration of vaccines; the creation of institutions associated with the vaccine and with vaccination; and the main obstacles it encountered in Bahia.

In the sequence of this article, the first section focuses on the problems caused by smallpox in colonial Bahia, the arrival of the Jennerian vaccine, the diffusion of the vaccination method, the creation of health institutions, and the measures to control the disease, which were implemented from 1808 on. The second section of this article, in the historical context of the Empire of Brazil, highlights the outbreaks of smallpox and discusses the problems related to the vaccine and to vaccination mentioned by the governors of the province of Bahia, as well as the local efforts to introduce the animal vaccine. These reflections are supported by primary printed sources published in Bahia in the nineteenth century, as well as through dialogues with specialized literature.

From arm to arm, the smallpox vaccine arrived in Bahia

Smallpox had been present on the coast of Bahia since the early colonial days. There are records of an epidemic of the disease beginning in the town of Ilhéus, in 1561, after the arrival of a ship from Lisbon[7]. Between 1562 and 1563, outbreaks of the disease spread throughout the entire coast of the province, reaching the loca-

tions of Itaparica and Salvador, then returning to Ilhéus and even reaching the countryside of the province. During that period, it caused the death of both enslaved Africans and native Indians. On 14 Jesuit missions with almost 40,000 indigenous people, 30,000 were killed by smallpox in only three months[8,9].

The disease continued to victimize settlers, indigenous people, and enslaved Africans during the colonial period. The great mortality of enslaved people in the cycles of the epidemic's outbreak caused the interruption of sugar and agricultural productions in general, the lack of food supply, poverty, starvation, and deaths.[8] Often, epidemics broke out after the arrival of slave ships, causing the disease to be associated with the slave trade[6,8,10,11]. According to Alden and Miller, there was a direct connection between droughts in Africa, resulting in famine, population movements, smallpox epidemics, increase in slave trafficking, and outbreaks of the disease in Brazil[10].

In the eighteenth century, smallpox in Bahia became something that "few visitors managed to avoid" (p. 175).[8] Although the etiology of the disease was unknown, its high contagiousness was recognized, and the quarantining of ships was recommended as the main and traditional measure to prevent the spread of diseases, often going against the interests of the slave dealers and the farm owners[12].

There are few records about the variolation technique during colonial Brazil[11,13,14]. Variolation was an ancient technique, traditionally used in Asia and Africa, which began to be used by Europeans from the start of the eighteenth century. The method consisted of the inoculation of the virus *in natura* contained in the pustules of a sick person, within a healthy person so that the second would develop the disease and could therefore become immune to it (p. 462)[15]. The inoculation of the virus without taking the proper precautions regarding its virulence caused some problems: it could provoke smallpox in both mild and lethal forms, and it could provide individual immunity, but it also caused the dissemination of the disease. The Portuguese were not as enthusiastic about it as the French, English, and North Americans. Chalhoub explains that the lack of interest stemmed from the fact that smallpox was not a serious health issue in Portugal at the time, although it often affected the colonies, especially with the intensification of slave trafficking (p. 105)[6].

In a letter from October 1802, written by the State Secretary of the Navy and Overseas (Secretário de Estado da Marinha e Ultramar), João Francisco de Sá e Melo Souto Maior, Viscount of Anadia, to the governor of Bahia, Francisco da Cunha Menezes, there is a reference to a royal decree entitled "Vaccine" (7/9/1799), with the recommendation that variolation should be introduced in the Portuguese "lands abroad" (Domínios Ultramarinos). That letter reiterated the order by the Prince Regent of that time that "the inoculation of smallpox should be introduced and promoted, mainly among young natives and enslaved black boys"[16], by doctors at the orphanages (Casa dos Expostos), and that the progress with the measures should be informed[17]. Although consecutive letters were sent by the Crown to the land owners and governors of the Portuguese colonies recommending the method, there are no records that it had been carried out in Bahia.

Information concerning the vaccine, created by Edward Jenner in 1796, was circulated in the following years. That vaccine, which became known as the Jennerian vaccine or "humanized vaccine", was produced with material extracted from the pustules of cows infected with bovine smallpox inoculated into the arm of a person. In the location of inoculation, a similar pustule developed, similar to the mild form of smallpox. From those eruptions, the "lymph" or "smallpox pus" was extracted to be inoculated into other individuals in a successive chain of immunization, called "arm-to-arm vaccination". That practice provided immunity against both the bovine form of the disease and the human form. It consisted of empirical knowledge about immunity, based on observation and experimentation, which presupposed hits and misses[15,18].

In the letter mentioned above, the "usefulness of the vaccine and the advantages of inoculation" are praised[16]. The letter was accompanied by a leaflet entitled "Preservation from smallpox eruptions and its terrible damages, or history of the origin and the discovery of the vaccine, the effects and symptoms, and the method to do vaccination", written by Doctor Manoel Joaquim Henriques de Paiva, published in 1801[16,17]. It indicates the concern of the Crown in instructing those who would be doing the inoculation of the vaccine in the colony; however, there were no indications regarding the sending of vaccines and/or vaccinators to Bahia at that time. The Portuguese government during the *Ancien Régime* understood that its role was to create an institutional framework for the organization and administration of the resources that would be pro-

vided to the population in face of the demands that arose in the colonies. (p. 517)[19].

The introduction of the vaccine in Bahia and in Brazil depended on the initiative of individuals, in that case Felisberto Caldeira Brant Pontes Oliveira e Horta, future Marquis of Barbacena. In 1804, he sponsored the trip to Lisbon for seven enslaved children who had not been infected by smallpox. At the metropolis, they would be vaccinated by the *cirurgião-mor* (chief surgeon) and sent back to Salvador. The person responsible for the children was Manoel Moreira da Rosa, chief surgeon of the ship, who was in charge of observing and learning the method of vaccination in Portugal. One of the children should be vaccinated seven days before the return ship, and the remaining ones would be inoculated from arm to arm during the return voyage to Bahia so as to guarantee that the vaccine did not deteriorate and lose its efficacy[13].

The initiative, although less ambitious in terms of its territorial reach and lacking official support, followed the "Real Expedición Filantrópica de la Vacuna" commanded by Francisco Xavier Balmis y Berenguer, conducted with 20 children passing the vaccine from arm to arm until reaching the Spanish overseas colonies between 1803 and 1806[20]. As a precaution, Caldeira Brant recommended to Manoel Moreira da Rosa to bring along "some rejected children" to be vaccinated during the return trip to Bahia and to give the vaccine to the ship's crew[13]. He feared that unforeseen problems would extend the return trip, compromising the quality of the vaccine. The voyage, however, took place uneventfully, and Caldeira Brant and his two-year-old son were vaccinated when the ship arrived in Bahia[16].

In 1805, a memorandum from governor Francisco da Cunha Menezes informed the ordering of "five small silver needles for the inoculation of the vaccine", an indication of the intention to incorporate the vaccine as a form of prevention[17], as well as the creation of a Director of Vaccination Services in Bahia, a position which became a paid job[13,21].

Bahia became a producing and distributing source of vaccines for several provinces, also spreading the instructions about the method of inoculation. In 1804 and 1809, vaccines were sent to Rio de Janeiro, Maranhão, Pernambuco, São Paulo, and Rio Grande do Norte. The process used was the same used during the trip from Lisbon[13,17]. One article published in the *Gazeta do Rio de Janeiro* (October 5, 1811, p. 8) mentioned that, in addition to providing vaccines to other provinces, Bahia also sent them to Angola. Letters from Caldeira Brant, in March 1805, informed that more than 3,000 people had been vaccinated in Bahia.[13] The data was published in the *Gazeta do Rio de Janeiro*, and the author of the article mentioned Bahia as "an example to be followed"[22]. However, some historians indicate more modest numbers of vaccinated people in Bahia: 2,510 in 1805; 1,416 in 1806; 954 in 807; 1,035 in 1808.[22]

In March 1806, João de Saldanha da Gama Melo e Torres, the governor of Bahia, wrote to the State Secretary of the Navy and Overseas, explaining the need to create the position of *provedor-mor da saúde* (chief health officer) in order to promote the vaccination and instruction of chief surgeons and their assistants[23]. The requisition was not followed up most likely because Portugal was under the threat of invasion by French troops, which would later take place, forcing the Royal Family and the Portuguese court to flee to Brazil.

On January 22nd, 1808, after a storm separated the Portuguese fleet bound for Rio de Janeiro during the transatlantic crossing, the ship with the Prince Regent Dom João arrived at the port of Salvador. The Prince Regent's stay in Salvador for nearly one month, in the end, was quite fruitful, with the creation of the positions of *físico-mor* (chief physician) and *cirurgião-mor* (chief surgeon) of the Kingdom, States, and Overseas Possessions[24]. To fill the position of chief physician, the Portuguese doctor Manoel Vieira da Silva Borges was chosen, while the Brazilian doctor, José Correia Picanço, was appointed to the position of chief surgeon of the Kingdom[25,26].

Another important milestone during the Prince Regent's stay was the creation of the Surgery School of Bahia (Escola de Cirurgia da Bahia). The school was established at the Royal Military Hospital of Bahia, which was located at the old building of the Jesuit school, at the Largo do Terreiro de Jesus[4,24]. The course covered the areas of human anatomy, physiology, pathology, and clinics. It lasted four years and offered the chairs of practical and speculative surgery, together with anatomy and surgical operations. At the conclusion of the course, the students had to pass the surgeon's exam to obtain the license to perform the job[24,27].

The teaching of Medicine in Bahia was decisive for the vaccine process. For a period of time, municipal assemblies of Brazilian towns had been requesting the province governors to create medical schools, a request denied by the Kingdom,

since it was required that the education of physicians be conducted in Portugal, a part of the strategy to maintain the colony and its elite dependent upon Portugal. (p. 54)[23]. This prohibition limited the availability of licensed doctors, physicians, and surgeons within the colony. There was a differentiation between those jobs. The first had a higher status and acted as medical doctors for the Crown, the town hall, and the troops in the main villages and towns. There were only three or four physicians in cities such as Recife, Salvador, and Rio de Janeiro in the eighteenth century. They were educated in European universities, like Coimbra, and were enabled to examine and treat "internal diseases"[19,24,28]. The surgeons learned the trade through practice, usually as assistants of a skilled surgeon or at a hospital which permitted the learning of anatomy and surgery (p. 151)[19]. The surgeons were identified with the "mechanical trades" or manual activities, such as bloodletting, making incisions, applied suction cups and leeches, healed wounds and fractures. These doctors were in charge of inoculating the vaccine[19,24].

Still in Bahia, Dom João signed the decree to open the Brazilian ports to international free trade, determined by a Royal Charter written in January 1808. Thanks to that decree, the commercial relations between Bahia and Europe were intensified, especially the relations with England and its possessions, with the United States, and with the countries of the River de La Plata region, also intensifying the slave trade[12,29]. A greater circulation of products and people favored the agricultural export economy and, at the same time, increased the risk of diseases.

In 1809, with the Portuguese court already settled in Rio de Janeiro, the position of Chief Health Officer of the Court and Brazilian State (Provedoria-mor da Saúde da Corte e do Estado do Brasil) was created. Among its designations was the responsibility to inspect and regulate the quarantining of slave ships. The objective was to prevent the arrival of infectious and contagious diseases, among those, smallpox. At the villages and provinces, that job would be performed by the *guarda-mores* (head guards), who should provide the places and necessary facilities to serve as hospitals for the sick, who should remain in observation for a minimum period of eight days[30].

Another important measure was the creation of the Vaccination Institution Council of the Court (Junta da Instituição Vacínica da Corte) in 1811[18]. For the position of General Inspector of the institution, Teodoro Ferreira de Aguiar, the Chief Surgeon of the army and doctor of the Royal Chamber was chosen. He took on the responsibility of vaccinating the boys taken to Lisbon by Caldeira Brant[31]. Besides being responsible for vaccination at the Court, the Institution was also responsible for providing the lymph or vaccine pus for other villages and provinces (p. 230-231)[32]. When Dom João arrived in Brazil, the vaccine was found to be "extinguished", and "the material that was being used in its place did not have the expected results". According to the newspapers, the king requested the vaccine from Bahia, because he knew that it "contained good pus"[31]. Until 1820, the vaccine inoculated at the Court (Rio de Janeiro) was being provided by Bahia to other provinces through the arm-to-arm process[33,34].

The transference of the Portuguese Court to Brazil resulted in the creation of the first political-administrative structures of public health, similar to those that existed in Portugal at the time[23]. The importation of vaccines, the local training for surgeons, and the creation health institutions to provide immunization were the main initiatives against smallpox until the independence of Brazil.

From the "humanized" vaccine to the "animal' vaccine in post-Independence Bahia

Between the last decade of the eighteenth century and the two first decades of the nineteenth century, Bahia was shaken by uprisings and rebellions by settlers and enslaved people, and finally by the war against the Portuguese rule. The fight for the political independence of Brazil, begun on June 25, 1822, extended until July 3, 1823, when the political separation of Brazil was consolidated in Bahia[29,35]. The long period of fighting, supported by farmers, land owners, and slave masters, disorganized the agricultural production and negatively impacted trade. Exports were penalized by the occupation of the port of Salvador by Portuguese troops and by the withdrawal of capital and resources from Portuguese merchants[29,32].

Besides the war, the scarcity and high prices of basic products resulted in famine and disease for the armies involved in the conflict and for the population as well[12,29]. In the report of the Interim Council for the Government of the Province of Bahia, its governor, Miguel Calmon Du Pin e Almeida, stated that the lack of resources to treat soldiers suffering from "epidemics and other diseases" resulted in the creation of the Hospital Inspection and the establishment of a medi-

cine warehouse in Vila da Cachoeira. The action was necessary considering the "exhaustion" of the *Recôncavo Baiano* area which received daily imports from Salvador of the medicine and "so many pharmaceutical goods needed for the prodigious number of sick people"[33].

Amazingly, smallpox vaccination in Salvador was not interrupted, at least during the tumultuous year of 1822. A note published by a local newspaper, signed by the officer in charge of vaccination, Chief Surgeon Francisco Rodrigues Nunes, informs that in 1822, 1,356 people had been vaccinated at the hall of the government Palace[37].

The times after independence were marked by political instability and economic crisis in Bahia. On October 12, 1822, Dom Pedro I was already the emperor of Brazil, and the National Constitutional Assembly had been working for months, but Bahia was still at war (p.256-266).[29] In Bahia, the imperial government was only recognized on July 16, 1823, amidst divergent positions from farmers and slave owners, the military, and Portuguese nationals who still lived in Salvador (p. 257)[29]. The land and slave owners feared a slave rebellion similar to the Haitian Revolution (1791-1804) and expected the emperor to help control the enslaved people. A minority was opposed to the monarchical regime and wanted complete autonomy for the province. Yet there were those who wanted and those who did not want Brazil to return to the condition of a kingdom united with Portugal (p. 256)[29]. Until the end of 1830s, there were persecutions against the Portuguese, military uprisings, slave and Indian rebellions, protests against sanitation measures, and demonstrations against rising prices and the scarcity of food[12,38,39].

By the Brazilian Constitution signed in March 1824, the nomination and dismissal of the governor of the province were actions taken by the emperor. There was also the creation of a Conselho Geral da Província (General Council of the Province), with a consultative character, whose objective was to "propose, discuss, and deliberate on the business of the provinces, proposing projects that were adjusted to the locations and to the urgency", which required the approval of the emperor. In a meeting in 1828, the council's first year of existence, the counselor, Maia Bitencourt, requested from the government "laws, instructions, and any other provisions regarding the vaccine, with the aim of formulating a proposal in favor of the inhabitants of the *Recôncavo Baiano* region, who were suffering from smallpox and its after effects"[40].

The concern had an underlying reason: between 1824 and 1829, there were ads in the newspapers of Salvador about runaway slaves in which the smallpox scars are highlighted in the descriptions. Qualifying expressions, such as "blemished face" and "pockmarked", appeared as an identification trait in almost every advertisement[41,42]. We do not know, however, if those enslaved individuals – being *jeje*, *nagô*, *tapas*, or *fulas* – had brought those scars from Africa, had caught the disease during the voyage, or had become sick after arriving in Bahia.

According to Reis, Johildo Athayde identified three peaks of mortality in the 1820s and 1830s, and out of those, two were caused by smallpox. The first peak, between 1823 and 1824, was a result of the war for independence and was related to deaths on the battlefields as well as to the crisis in food supply and rising prices, which made the deficient nutrition of the Bahians even more precarious. The second was a consequence of an outbreak of smallpox, which spread throughout the entire town in 1830, with some lingering cases still in 1831; the third occurred in 1837 and 1838, caused by the Sabinada rebellion and epidemics of smallpox and rubella (p. 35)[38].

However, between 1823 and 1839 the speeches by the governors of the province did not mention smallpox or vaccination, most likely because they were more worried about solving the political and economic problems of post-independence Bahia. Changes highlighted by the 1824 Constitution gave to the broad jurisdiction municipal assemblies on every matter of importance to the community, including the cleaning up of public spaces, the maintenance of charity institutions, medical care, and vaccination. In April 1838, the newspaper *Correio Mercantil* published the "Demonstrative Map" of vaccinated people in the province of Bahia, in the year of 1837, informing that "the disease continued to be the same, as shown in previous maps presented annually to the Municipal Assembly"[43].

The newspaper revealed that between January and December 1837, the vaccine had been administered to 1,207 free children, 1,088 enslaved children, 303 free adults, and 2,921 enslaved individuals. The total number of vaccinated slaves was 4,009, higher than the number of vaccinated free people, 1,510[43]. The small number of vaccinated free adults suggests that the majority was submitted to some kind of authority or coercion. By contrast, the larger number of vaccinated slaves may be related to outbreaks of smallpox caused by the arrival of Africans to the port of Salvador.

Ciência & Saúde Coletiva, 27(9):3429-3440, 2022

It is also important to consider the concern of the land owners in preserving "a resource", which was increasingly more expensive and scarcer for the Bahian farmers, after the English had prohibited the transatlantic slave trade. That issue intensified the competition for enslaved individuals between the most economically dynamic provinces (p. 41)[38].

According to the newspaper, more than 600 people who had been vaccinated did not show up at the "Vaccination Room" by the 8th day[43]. There was a concern related to the expectation that, after the eight day period, it was possible to verify if the vaccine had been valid or not.[44] Moreover, the "arm-to-arm" vaccination procedure was based on the inoculation of the lymph of the cow vaccine into a person, through an incision made by a needle. After that, it required a waiting period of eight to ten days for the formation of pustules and their ripening, so the lymph could be extracted and used. If a vaccinated person did not return, that impacted the process, compromising the verification/validation as well as the production and distribution of fresh and efficient vaccines in Bahia.

In 1830, vaccination was restricted to Salvador and towns from the *Recôncavo Baiano* region[43]. In a speech addressed to the Municipal Assembly, the governor of the province at the time, Thomaz Xavier Garcia de Almeida (1838/1840), commented that in many municipalities there was no one interested in performing the job of "vaccinator" due to the modest remuneration for the job. In other places, the vaccine did not have the desired effect because the "vaccine pus sent by London" had expired, "possibly because they did not know how to preserve it or use it or because of the scabs that commonly appeared" (p. 23)[45].

Almeida wanted the Health Council to take up vaccination in Bahia, since it was "a business in the realm of Medicine" (p. 24)[45]. The department, created by an 1838 law, was comprised of doctors, surgeons, pharmacists and "other people with the knowledge of physical and natural sciences", and sought to guide the public administration in the case of epidemics[45,46]. The Council had the attribution of indicating delegates for townships, instructing them on the "way to proceed successfully in such a situation", also taking responsibility for the distribution of vaccines by the government as soon as they arrived from Europe (p. 23-24)[45].

Regardless of the creation of the council, criticism continued in the speeches of Almeida's successors[45,47-49]. They blamed the failure of the vaccination in the countryside of Bahia on the lack of qualified personnel and the low remuneration for the service provided. Some people also called attention to the lack of care by the vaccinators who did not follow the regulated prescriptions. Moreover, the vaccine lost its immunization effect some time after the inoculation, demanding constant re-vaccination.

For Antonio Ignácio D'Azevedo, governor of the province in 1846/1847, vaccination had only had some success in the capital. In the countryside, many would only take the vaccine when forced to do so[50]. The population considered the vaccine to be "like a pest, and its distributors were like assassins". They thought their lives were in danger, and the intervention of the government was required in order to avoid a fatal outcome, according to Governor Francisco G. Martins (1851/1852) (p. 14)[51]. In general, the government officials attributed the resistance against vaccination to the ignorance of the population regarding its benefits. The arm-to-arm vaccination caused disgust among those who associated that procedure with the transmission of other diseases[52]. Governor Venâncio Lisboa (1874/1875) mentioned the fact that people inoculated with "smallpox pus" could spread the disease[53]. Martins attributed the responsibility for the dissemination of smallpox to "charlatans and ignorant people" who, in some towns, inoculated the fluid from the pustules to "supply the vaccine" (p. 15)[51]. Although inoculation was done with benign smallpox samples, fatal strands could appear on inoculated people, threatening lives and communities.

D'Azevedo believed that such matters could be resolved with the approval of the Regulation of the Imperial Vaccine Institute (Instituto Vacínico do Império) in 1846[50]. The Institute would act as a central normative organ in every province, as part of a larger trend of centralization in the Second Reign (1840-1889). It established mandatory vaccination for the entire population, regardless of age, sex, state, and condition, except for people who showed the signs of "actual smallpox". Although it showed progress in the fight against smallpox, the Vaccine Institute had many limitations from a financial, political, and jurisdictional point of view, which hindered its ability to act as planned[15,18].

Official documents from Bahia continued to register the poor use of the pustules, the lack of regularity in the shipments of smallpox pus, and the poor conservation of them, which were shipped from Europe inside glass plates, capillary tubes or even led cases[45,47,48,50]. Even when

it arrived in good conditions, the vaccine could deteriorate while being transported to the provinces. To solve that problem, the Health Council proposed that doctors paid by the government be sent to the municipalities, "taking with them the vaccine in living people", thereby avoiding the problems related to the poor conservation of the plates[47,48]. The execution of that provision could, however, overburden the public finances and would only be followed during epidemic periods. For D'Azevedo (p. 26)[50], the problem of conservation and efficiency of the vaccine could be solved if the vaccine agents came every Sunday to the municipal assemblies where they lived and vaccinated everyone who showed up. Afterwards, the agents should spend eight days vaccinating at other locations, thus taking advantage of the lymph from the recently vaccinated.

In 1866, the recently created newspaper, *Gazeta Médica da Bahia*, published that the director of the Berlin Vaccine Institute had found a better way to preserve "smallpox pus, allowing it to be applied to a larger number of individuals and facilitating its transportation in good conditions over long distances and in tropical climates"[54]. The article described the method: after the pus is collected from the pustule of a child infected eight days before, with the use of a small paint brush – which had to be new – the paint brush should be dipped in "10 to 20 drops of chemically pure glycerin, diluted in an equal amount of water, on a glass or porcelain plate", blending the mixture with a paintbrush. The mixture could be immediately used in vaccination or could be preserved for later use. If proved, the anonymous writer of the article wondered, the discovery could have high value for Bahia, since it "allowed for the indefinite storage of a good provision of vaccine lymph that could supply the towns in the countryside". Enthusiastically, the author of the article invited the "vaccine agent colleagues from the Capital to practice this method in order to extending and preserve the vaccine", and once the experiment was validated, it would have enormous usefulness to the country, where "numerous victims fall ill with smallpox in distant places"[54].

From the 1840s on, the process of vaccination went through changes, with the end of the "arm-to-arm" inoculation in many places around the world. It was gradually substituted by the vaccine cultivated and extracted from calves and inoculated directly in humans; the process was called "animal vaccine" and was considered more efficient than the Jennerian process[18]. Those innovations took some time to reach Brazil, and the vaccination and revaccination services in the provinces did not have the results expected by the authorities. People from Bahia continued to deal with epidemic outbreaks of smallpox, with high numbers of sick and dead, especially between 1847 and 1849, between 1875 and 1876, and between 1884 and 1885[8,49,55,56].

In 1888, news spread in Bahia about the introduction of the animal vaccine in the Imperial Court, brought by the physician Pedro Affonso Franco, who later would become Baron of Pedro Affonso. The capital of the empire was being hit hard by the 1887 smallpox epidemic[18]. The governor of the province, Machado Portella (1888/1889), sought to develop the immunizing agent in Bahia[57]. After being informed that the Imperial Government would send a doctor to introduce the new method in the northern provinces, Portella requested that the doctor also come to Bahia, offering, in exchange, the animals to be inoculated (p. 59)[57]. Regardless of the insistence of Portella, the animal vaccine did not reach Bahia until the end of the imperial period, brought by Henrique de Toledo Dodsworth, a doctor commissioned by the Imperial Government and the grandson of Pedro Afonso[57,58]. The method began to be used on May 11, 1889, at the Vaccine Institute of Bahia (Instituto Vacínico da Bahia), which was located on the ground floor of the Governor's Palace, where the Hygiene Commission (Inspetoria de Higiene) was also located, under the direction of Alexandre Affonso de Carvalho. The inoculated calves were kept in the palace's stables[59].

In November 1888, the newspaper, *Gazeta Médica da Bahia*, published the "Instructions for the use of animal vaccine", organized by Pedro Affonso under the recommendation of the Ministry of Empire Affairs. Destined to the vaccinators, the instructions were detailed and explained the differences between the human and the animal vaccine. The article informed that the lymph extracted from the calf pustules required "scrapping" and "the complete removal of the scabs covering the pustules". The procedure, however, did not cause the secretion of any fluid, since the pustules remained dry[60]. Such instructions reflected the debate in the medical field about the possibility that bovine diseases could be transmitted by vaccination[13].

To retrieve the lymph, the scab should be removed, the surface should be scraped lightly; a "viscous and transparent liquid" which coagulates in the tubes would be collected from it. That lymph, however, should be refused, given its low potency, in favor of the "pulp" of the vaccine, a

yellowish or pinkish substance, semi-solid, deposited in the base of the vaccine pustules, extracted by scraping the pustule with a lancet or curette. The vaccine pulp, extremely rich in virulent material, could be used immediately or could be prepared with some drops of pure and neutral glycerin. The mixture, however, was sensitive to light and heat, and should be preserved in tubes with dark wrapping and stored in a fresh environment. If the lymph in the tubes was too solid, it could be diluted in some drops of distilled water[60].

To proceed with the vaccination with animal lymph, the vaccinator needed to use a triangular lancet, which was inserted under the skin obliquely, and the vaccine was then inoculated in this small opening in the skin. The instructions considered the inoculation to be prudent in only three spots in the arm, since the reaction to the animal vaccine was more severe than the reaction to the human vaccine, causing the appearance of larger pustules which could join together, thus infecting a larger area, causing undesirable consequences. The eruptions could start by the fourth day after inoculation, and the pustule could reach maturity in 10 to 12 days. To prevent the unwanted inflammation of the aureoles of the pustules, it was recommended to brush the area around the pustules with "collodium-iodoform"[60].

The lymph coming out of the pustules could be used for inoculation as long as the vaccinator "chose the 'vaccine children' well". The vaccine was only efficient when collected from the pustules caused by the first vaccination. It was advised that the lymph from individuals who were being re-vaccinated should not be used, since it did not have the strength required for immunization. Although it remained active for a period, the vaccine lost its efficiency in humans after some time, although it did not fail when inoculated in a calf. The old vaccine, however, could be reused; after having been inoculated in a calf, the pulp retrieved on the fifth day produced a good quality vaccine[60].

These instructions reveal the immense challenge for the government of Bahia in the 1800s given the complexity of the production process, conservation, manipulation, and application of the vaccine, whether in humanized or animal form. Among the infectious-contagious diseases, smallpox was one of the few – together with yellow fever and cholera, which arrived in Salvador in 1849/1850 – to receive attention due to its impact on the operation of the port and on the economy. Therefore, at the end of the nineteenth century, Salvador had, along with the vaccination service provided by the Port Health Commission (Inspetoria de Saúde do Porto), an agency from the central government and the Provincial Vaccine Institute (Instituto Vacínico da Província), created in 1855.

Final considerations

Regardless of the institutional and political efforts and the technical and scientific innovations in vaccine production, smallpox continued to plague the population of Bahia. The innovations did not result in a more favorable scenario for vaccination nor in more immediate and effective results. The quality and effectiveness of the vaccine was still questioned, as was the mandatory nature of the procedure. In the end of the nineteenth century, in 1897, already under a Republican government, the inhabitants of Salvador had to endure one of the most severe epidemics in Bahia ever, as the disease affected 4,575 people and killed 1,676, lingering into the following year (p. 98)[55]. During those epidemics, even with the improvements in the vaccines, the creation of institutions, and the development of new medical knowledge, the local response to the disease was no different than what had been done in the past: provisional infirmaries, partnerships with charity hospitals, emergency assignment of doctors, home treatment for the smallpox victims, and general prophylactic measures, such as the sending of vaccines and medications to the homeless in the capital and the countryside, as well as services of transportation and burial of the dead[3,56,61]. Smallpox continued to victimize the inhabitants of Salvador and Bahia in the first two decades of the 20th century, with the most severe outbreak occurring in 1919[62]. Its decrease from 1930 on was a result of multiple factors of a political, biomedical, and technical nature: the permanent immunity acquired by those who overcame the disease, the improvements in the sanitation services at the federal and state levels, the increase in vaccination coverage, and the progressive reduction in the disease's lethality.

Collaborations

Both authors contributed equally in all stages of the article's elaboration.

References

1. Hochman G. Priority, invisibility and eradication: the history of smallpox and the Brazilian public health agenda. *Med Hist* 2009; 53(2):229-252.
2. Hochman G. Quando e como uma doença desaparece. A varíola e sua erradicação no Brasil, 1966/1973. *Rev Bras Sociol* 2021; 9(21):103-128.
3. Mattoso KMQ. *Bahia: a cidade do Salvador e seu mercado no século XIX*. São Paulo, Salvador: Hucitec, SMEC; 1978.
4. Escola de Cirurgia da Bahia (Verbete). *Dicionário histórico-biográfico das ciências da saúde no Brasil (1832-1930)*. [acessado 2021 dez 10]. Disponível em: http://www.dichistoriasaude.coc.fiocruz.br/iah/pt/verbetes/escirba.htm
5. Barbosa KO, Gomes F. Doenças, morte e escravidão africana: perspectivas historiográficas. In: Pimenta TS, Gomes F, organizadores. *Escravidão, doenças e práticas de cura no Brasi*l. Rio de Janeiro: Outras Letras; 2016. p. 273-305.
6. Chalhoub S. *Cidade febril: cortiços e epidemias na corte imperial*. São Paulo: Companhia das Letras; 1996.
7. Ribeiro L. *Medicina no Brasil Colonial*. Rio de Janeiro: Editora Sul Americana; 1971. p.16.
8. Azevedo T. *Povoamento da cidade do Salvador* (Edição Fac-similar). Salvador: Fundação Pedro Calmon; 2009. p.112.
9. Barbosa P, Rezende CB. *Os serviços de saúde pública no Brasil: especialmente na cidade do Rio de Janeiro: de 1808 a 1907*. Rio de Janeiro, Imprensa Nacional, DGSP; 1909.
10. Alden D, Miller JC. Out of Africa: the slave trade and the transmission of smallpox to Brazil, 1560-1831. *J Interdiscip Hist* 1987; 18(2):195-224.
11. Gurgel C. *Doenças e curas: o Brasil nos primeiros séculos*. São Paulo: Contexto; 2010.
12. Sousa AP. A cidade de Salvador no contexto da Independência da Bahia: a dinâmica mercantil de uma cidade-capital (finais do século XVIII e início do século XIX). In: Leal MGA, Sousa AP, organizadores. *Capítulos de história da Bahia: Independência*. Salvador: Assembleia Legislativa da Bahia, Eduneb; 2017. p.83-110.
13. Lopes MB, Polito R. "Para uma história da vacina no Brasil": um manuscrito inédito de Norberto e Macedo. *Hist Cienc Saude Manguinhos* 2007; 14(2):595-605.
14. Sá MR. A "peste branca" nos navios negreiros: epidemias de varíola na Amazônia colonial e os primeiros esforços de imunização. *Rev. Latinoam. de Psicopatol* 2008; 11(4 Suppl): 818-826.
15. Fernandes TM. Imunização antivariólica no século XIX no Brasil: inoculação, variolização, vacina e revacinação. *Hist Cienc Saude-Manguinhos* 2003; 10(Supl. 2):461-474.
16. Bahia. Província da Bahia. Falla que recitou o excellentissimo presidente da provincia da Bahia, Paulo José de Mello Azevedo e Brito, n'abertura da Assembléa da mesma provincia em 2 de fevereiro de 1841. Bahia: Typ. de Epifanio J. Pedroza; 1841. [acessado 2021 dez 2]. Disponível em: http://ddsnext.crl.edu/titles?f%5B2%5D=subject%3ABahia%20%28Brazil%29
17. Marinho MGSMC. A varíola e a vacina na América Portuguesa. Difusão de práticas e saberes médicos na documentação do Arquivo Histórico Ultramarino e em fontes dispersas. In: Mota A, Marinho MGSMC, Bertolli Filho C. *As enfermidades e suas metáforas: epidemias, vacinação e produção de conhecimento*. São Paulo: FMUSP; 2015. p. 155-169.
18. Fernandes TM. *Vacina antivariólica: ciência, técnica e o poder dos homens, 1808-1920*. Rio de Janeiro: Editora Fiocruz; 2010.
19. Abreu L. A institucionalização do saber médico e suas implicações sobre a rede de curadores oficiais na América portuguesa. *Tempo* 2018; 24(3):493-524.
20. Balaguer Perigüel E, Ballester Añon R. *En el nombre de los niños. Real expedición filantrópica de la vacuna, 1803-1806*. Madrid: Asociación Española de Pediatría; 2003.
21. Avisos. *Gazeta do Rio de Janeiro*; 1809 Out. 14; n.114; p.4. [acessado 2022 abr.10]. Disponível em: http://objdigital.bn.br/acervo_digital/div_periodicos/gazeta_rj/gazeta_rj_1809/gazeta_rj_1809_114.pdf
22. Portugal FS. *A institucionalização da vacina antivariólica no Império Luso-brasileiro nas primeiras décadas do Século XIX* [dissertação]. Rio de Janeiro: Casa de Oswaldo Cruz/Fiocruz; 2018.
23. Subtil J. O antigo regime da saúde pública entre o Reino e o Brasil. *Rev Ultramares* 2015; 8(1):39-66.
24. Pimenta TS. Médicos e cirurgiões nas primeiras décadas do século XIX no Brasil. Dossiê história das doenças e das práticas do curar nos oitocentos. *Almanack* 22:88-119.
25. Cirurgião-Mor do Reino, Estado e Domínios Ultramarino. Arquivo Nacional. Memória da Administração Pública Brasileira. [acessado 2021 dez 10]. Disponível em: http://mapa.an.gov.br/index.php/dicionario-periodo-colonial/154-cirurgiao-mor-do-reino-estados-e-dominios-ultramarinos
26. Físico-Mor/Fisicatura-Mor do Reino, Estado e Domínios Ultramarino. Arquivo Nacional. Memória da Administração Pública Brasileira. [acessado 2021 dez 10]. Disponível em: http://mapa.an.gov.br/index.php/dicionario-periodo-colonial/182-fisico-mor-fisicatura-mor-do-reino-estado-e-dominios-ultramarinos
27. Bahia. Escola de Cirurgia da Bahia (Verbete). Arquivo Nacional. Memória da Administração Pública Brasileira. [acessado 2021 dez 10]. Disponível em: http://mapa.an.gov.br/index.php/dicionario-periodo-colonial/172-escola-de-cirurgia-da-bahia
28. Edler F, Pires-Alves F. A educação médica: do aprendiz ao especialista. In: Teixeira, LA, Pimenta TS, Hochman G, organizadores. *História da saúde no Brasil*. São Paulo: Hucitec; 2018. p. 101-144.
29. Tavares LHD. *História da Bahia*. São Paulo, Salvador: Edunesp, EDUFBA; 2008.
30. Provedor-Mor/Provedoria-mor da Saúde da Corte e Estado do Brasil. Arquivo Nacional. Memória da Administração Pública Brasileira. [acessado 2022 dez 10]. Disponível em: http://mapa.an.gov.br/index.php/dicionario-periodo-colonial/210-provedor-mor-provedoria-mor-de-saude-da-corte-e-estado-do-brasil

31. Avisos. *Gazeta do Rio de Janeiro*; 1811 Out. 5; p. 8. [acessado 2021 dez 4]. Disponível em: http://memoria.bn.br/DocReader/cache/256703301966/I0001779-2-0-001865-001500-003284-002641.JPG
32. Cabral D, Camargo AR, organizadores. *Estado e administração: a corte joanina no Brasil*. Rio de Janeiro: Arquivo Nacional; 2010.
33. Avisos. *Gazeta do Rio de Janeiro*; 1815 Out.21; p. 4. [acessado 2022 abr.10]. Disponível em: http://memoria.bn.br/DocReader/cache/3869702205273/I0003780-2-0-001949-001500-003402-002618.JPG
34. Avisos. *Gazeta do Rio de Janeiro*; 1820; Out. 4; p. 1. [acessado 2022 abr.10]. Disponível em: http://memoria.bn.br/DocReader/cache/3869702205273/I0006074-2-0-001895-001500-003207-002538.JPG
35. Leal MGA, Sousa AP, organizadores, *Capítulos de história da Bahia: Independência*. Salvador: Assembleia Legislativa da Bahia, EDUNEB; 2017. p.83-110.
36. Bahia. Província da Bahia.Relatório dos trabalhos do Conselho Interino de Governo da Província, em prol da Regência e Império de sua Majestade Imperial o senhor D. Pedro I e da Independência Política do Brasil por Miguel Clamon Du Pin e Almeida. Bahia: Typographia Nacional;1823. p. 9. [acessado 2021 out 6]. Disponível em: http://ddsnext.crl.edu/titles?f%5B2%5D=subject%3ABahia%20%28Brazil%29
37. Avisos. *Idade D'Ouro do Brazil; 1*823 Jan. 10; p. 4. [acessado 2021 dez 4]. Disponível em: http://memoria.bn.br/DocReader/cache/556280267071/I0004075-2-0-002429-001500-003324-002053.JPG
38. Reis JJ. *A morte é uma festa: ritos fúnebres e revolta popular no Brasil do século XIX*. São Paulo: Companhia das Letras; 1991.
39. Reis JJ. A elite baiana face os movimentos sociais, Bahia 1824-1840. *Rev Hist* 1976; 54(108):341-384.
40. Oliveira NCG. *O Conselho Geral de Província: espaço de experiência política na Bahia 1828-1834* [tese]. Niterói: Universidade Federal Fluminense; 2017.
41. Avisos. *Grito da Razão*; 1824 Mar. 12; p. 6; 13 de Abr. de 1824, p. 3; 27 de Jul. de 1824; p. 4. [acessado 2021 dez 4]. Disponível em: http://memoria.bn.br/DocReader/cache/51403008822274/I0000052-2-0-002381-001500-003271-002061.JPG
42. Avisos. *O Bahiano*; 1829 Jun. 6; p. 4. [acessado 2021 dez 4]. Disponível em: http://memoria.bn.br/DocReader/cache/114501527172/I0000109-2-0-002319-001500-003163-002046.JPG
43. Mapa demonstrativo das pessoas vacinadas na Capital da Província da Bahia, no ano de 1837. *Correio Mercantil;* 1838 Abr. 24; p. 4-5. [acessado 2021 dez 4]. Disponível em: http://memoria.bn.br/DocReader/cache/3213808592449/I0000067-2-0-002212-001500-003419-002318.JPG
44. Pimenta TS, Barbosa K, Kodama K. Varíola e vacina na província do Rio de Janeiro. In: Franco S, Pimenta TS, Mota A, organizadores. *No rastro das províncias: as epidemias no Brasil oitocentista*. Vitória: EDUFES; 2019. p. 327-352.
45. Bahia. Província da Bahia. Falla que recitou o presidente da provincia da Bahia, Thomaz Xavier Garcia de Almeida, n'abertura da Assembléa Legislativa da mesma provincia em 2 de fevereiro de 1840. Bahia: Typ. de Manoel Antonio da Silva Serva; 1839 [1840]. [acessado 2021 out 6]. Disponível em: http://ddsnext.crl.edu/titles?f%5B2%5D=subject%3ABahia%20%28Brazil%29
46. Santiago U. *Evolução da saúde pública na Bahia. Instituto Bahiano de História da Medicina. Arquivos* 1956; 5:42-44.
47. Província da Bahia. Falla que recitou o excellentissimo presidente da provincia da Bahia, Paulo José de Mello Azevedo e Brito, n'abertura da Assembléa da mesma provincia em 2 de fevereiro de 1841. Bahia: Typ. de Epifanio J. Pedroza; 1841. [acessado 2021 ou 6]. Disponível em: http://ddsnext.crl.edu/titles?f%5B2%5D=subject%3ABahia%20%28Brazil%29
48. Província da Bahia. Falla que recitou o presidente da provincia da Bahia, o conselheiro Joaquim José Pinheiro de Vasconcellos, n'abertura da Assembléa Legislativa da mesma provincia em 2 de fevereiro de 1842. Bahia: Typ. de J.A. Portella e Companhia; 1842. [acessado 2021 out 6]. Disponível em: http://ddsnext.crl.edu/titles?f%5B2%5D=subject%3ABahia%20%28Brazil%29
49. Bahia. Província da Bahia. Falla que recitou o presidente da provincia da Bahia, o dezembargador João José de Moura Magalhães, n'abertura da Assembléa Legislativa da mesma provincia em 25 de março de 1848. Bahia: Typ. de João Alves Portella; 1848. [acessado 2021 out 6]. Disponível em: http://ddsnext.crl.edu/titles?f%5B2%5D=subject%3ABahia%20%28Brazil%29
50. Bahia. Província da Bahia. Falla que recitou o presidente da provincia da Bahia, o conselheiro Antonio Ignacio d'Azevedo, n'abertura da Assembléa Legislativa da mesma provincia em 2 de fevereiro de 1847. Bahia: Typ. do Guaycurú de D. Guedes Cabral; 1847. [acessado 2021 out 6]. Disponível em: http://ddsnext.crl.edu/titles?f%5B2%5D=subject%3ABahia%20%28Brazil%29
51. Bahia. Província da Bahia. Falla que recitou o presidente da provincia da Bahia, o dezembargador conselheiro Francisco Gonçalves Martins, n'abertura da Assembléa Legislativa da mesma provincia em 4 de julho de 1849. Bahia: Typ. de Salvador Moitinho; 1849. [acessado 2021 out 6]. Disponível em: http://ddsnext.crl.edu/titles?f%5B2%5D=subject%3ABahia%20%28Brazil%29
52. Bahia.Província da Bahia. Falla recitada na abertura da Assembléa Legislativa da Bahia pelo presidente da provincia, o conselheiro e senador do imperio Herculano Ferreira Penna, em 10 de abril de 1860. Bahia: Typ. de Antonio Olavo da França Guerra; 1860. [acessado 2021 out 19]. Disponível em: http://ddsnext.crl.edu/titles?f%5B2%5D=subject%3ABahia%20%28Brazil%29

53. Officio de Dr. Venancio José de Oliveira Lisboa passou a administração da Província ao 4 Vice-Presidente, Dr. José Eduardo Freire de Carvalho em 20 de junho 1975. Bahia: Typ. do Jornal da Bahia; 1875. [acessado 2021 out 6]. Disponível em: http://ddsnext.crl.edu/titles?-f%5B2%5D=subject%3ABahia%20%28Brazil%29
54. Pus vacinnico diluido em glycerina. *Gaz Med Bahia* 1866; (1):14. [acessado 2021 out 19]. Disponível em http://www.gmbahia.ufba.br/index.php/gmbahia/index
55. Barreto ALB. *O estado sanitário da Bahia*. Bahia: Imprensa Official do Estado; 1928. Disponível em: http://ddsnext.crl.edu/titles?f%5B2%5D=subject%3ABahia%20%28Brazil%29
56. Província da Bahia. Falla com que o Exmº. Sr. Conselheiro Theodoro Machado Freire Pereira da Silva abriu a 1ª sessão da 26ª legislatura da Assembléia Legislativa Provincial no dia 3 de abril de 1886. Bahia: Typ. da Gazeta da Bahia; 1886. [acessado 2021 out 6]. Disponível em: http://ddsnext.crl.edu/titles?-f%5B2%5D=subject%3ABahia%20%28Brazil%29
57. Província da Bahia. Falla com que o Illmº. e Exmº. Sr. Manoel Nascimento Machado Portella presidente da província abriu a 1ª sessão da 27ª legislatura da Assembleia Legislativa Provincial no dia 3 de abril de 1888. Bahia: Typ. da Gazeta da Bahia; 1888. [acessado 2021 out 6]. Disponível em: http://ddsnext.crl.edu/titles?f%5B2%5D=subject%3ABahia%20%28Brazil%29
58. Província da Bahia. Falla com que o Exmº. Sr. Des. Aurélio Ferreira Espinheira 1 Vice-Presidente da provincia abrio a 2a sessão da 27a legislatura da Assembléa Legislativa Provincial no dia 3 de abril de 1889. Bahia: Typ. Da "Gazeta da Bahia"; 1889. [acessado 2021 out 6]. Disponível em: http://ddsnext.crl.edu/titles?-f%5B2%5D=subject%3ABahia%20%28Brazil%29
59. Araújo EJ. "Relatorio do Instituto Vaccinico". In: Ferreira JL. Mensagens e Relatórios apresentados à Assembléa Geral Legislativa pelo chefe de divisão reformado Joaquim Leal Ferreira Vice-Governador do Estado. Bahia: Typ. "Diário da Bahia"; 1892. [acessado 2021 out 6]. Disponível em: http://ddsnext.crl.edu/titles?f%5B2%5D=subject%3ABahia%20%28Brazil%29
60. Higiene Pública. Instruções para o uso da vacina animal. *Gaz Med. Bahia* 1888; 20:237-240. [acessado 2021 out 6]. Disponível em http://www.gmbahia.ufba.br/index.php/gmbahia/index
61. Vianna L. Mensagem apresentada à Assembleia Geral Legislativa pelo Exm. Sr. Dr. Luiz Vianna, governador da Bahia, em 15 de março de 1900. Bahia: Typ. do Correio de Notícias; 1900. [acessado 2021 out 6]. Disponível em: http://ddsnext.crl.edu/titles?f%5B2%-5D=subject%3ABahia%20%28Brazil%29
62. Souza CMC, Hochman G. Ano de nove, ano de varíola: a epidemia de 1919, em Salvador, Bahia. *Fenix* 2012; 9(3):1-19. [acessado 2022 jan 25]. Disponível em: https://www.revistafenix.pro.br/revistafenix/article/view/412

Article submitted 29/03/2022
Approved 12/04/2022
Final version submitted 14/04/2022

Chief editors: Romeu Gomes, Antônio Augusto Moura da Silva