

THE DIFFICULTIES OF RIVERINE PEOPLES IN ACCESSING IMMUNIZATION: A SYSTEMATIC LITERATURE REVIEW

 <https://doi.org/10.63330/aurumpub.070-013>

Rafaela Teles Duarte¹, Gabriel da Silva Santana², Luciléa Souza da Cunha Pereira³, Madalena Silva Raiol⁴ and Brenda Tanielle Dutra Barros⁵

Abstract

Introduction: The vaccination strategy seeks to achieve the highest possible vaccination coverage, including through outreach activities aimed at rural and hard-to-reach populations, such as Amazonian riverine communities, whose members would be unlikely to receive vaccines without the National Immunization Policy (Política Nacional de Imunização – PNI). **Objective:** To synthesize the scientific literature on the difficulties faced by Amazonian riverine populations in accessing immunization.

Methodology: This systematic literature review was conducted in accordance with the recommendations of the PRISMA protocol. Searches were performed in the BVS/LILACS, SciELO, PubMed/PMC, and Google Scholar databases between August and October 2024, using the descriptors “riverine population,” “immunization,” “vaccination coverage,” and “Amazon,” combined with the Boolean operators AND/OR. Empirical studies published between 2014 and 2025 that addressed access, barriers, or immunization strategies in riverine communities in the Brazilian Amazon were included. **Results:** Eight studies were included, most of which were conducted in the states of Pará and Amazonas and employed

¹ Nurse specializing in women's health
E-mail: liztavares2409@icloud.com
ORCID: <https://orcid.org/0009-0004-0795-7996>

² Nurse
E-mail: Gabrielimuniza25@gmail.com
ORCID: <https://orcid.org/0009-0000-2425-103X>

³ Nurse
E-mail: Lucileasouza03@gmail.com
O ORCID rcid: <https://orcid.org/0009-0008-0237-7430>

⁴ Nurse
E-mail: Madalenaraiol30@gmail.com
ORCID: <https://orcid.org/0009-0000-5410-2246>

⁵ Master's degree in Nursing from UFPA
E-mail: Brendatanielle.enf@gmail.com
ORCID: <https://orcid.org/0000-0002-3184-050X>

cross-sectional or qualitative designs or experience reports. The findings converge around three themes: geographical and logistical barriers to access; factors related to the organization of health services; and strategies that promote vaccine uptake, such as Riverine Primary Health Care Units and outreach activities. **Final considerations:** Distance, river transportation, the irregular operation of vaccination rooms, and misinformation were the main barriers identified in the literature. Territory-based strategies involving Community Health Workers and continuing health education proved essential to increasing vaccination coverage among these populations.

Keywords: Health Policy, Immunization, Nursing, Primary Health Care, Riverine Population.

INTRODUCTION

The Unified Health System (Sistema Único de Saúde – SUS) is guided by the principles of comprehensive care, universality, and equity and is organized into levels of care that provide services to the Brazilian population according to their degree of complexity. Through the National Immunization Policy (Política Nacional de Imunização – PNI), SUS provides dozens of vaccines to prevent numerous diseases, constituting one of the greatest achievements of public health and benefiting every age group. Immunization is one of the primary means of reducing morbidity and mortality among children, adolescents, and adults from vaccine-preventable diseases and ranks among the most cost-effective interventions associated with reductions in illness and hospitalization (Silva et al., 2023).

The vaccination strategy seeks to achieve the highest possible vaccination coverage. To this end, outreach vaccinations are conducted outside health care facilities, including in people's homes, with a particular focus on those living in rural and hard-to-reach areas. These activities reach populations whose members would be unlikely to receive vaccines without the PNI (Barbosa et al., 2020).

To include the most remote populations, the National Primary Care Policy (Política Nacional de Atenção Básica – PNAB) established the National Policy for the Comprehensive Health of Rural, Forest, and Water Populations, which serves as the point of entry to the Health Care Networks (Redes de Atenção

  Sa de – RAS). In this context, Riverine Family Health Strategy (Estrat gia Sa de da Fam lia Ribeirinha – ESFR) teams ensure that riverine communities have more comprehensive access to health care (Silva et al., 2020).

Riverine populations live along the banks of Amazonian rivers and derive their livelihoods from fishing, extractivism, and family farming. Their communities generally lack basic sanitation and treated water, while their traditional knowledge, together with religious beliefs, shapes their own approaches to preventing and treating illness (Motta et al., 2020). Their distance from municipal centers, scarcity of resources, and need for lengthy river journeys make subsistence a recurring challenge for this population, underscoring the importance of health promotion and disease prevention within Primary Health Care (Aten  o Prim ria   Sa de – APS), particularly with regard to infectious, parasitic, and vaccine-preventable diseases, which are more prevalent in Brazil’s Northern Region (Barbosa et al., 2020).

Studies indicate that geographical, socioeconomic, and organizational factors directly affect vaccination coverage among populations living in floodplain and hard-to-reach areas of the Amazon, requiring immunization teams to adopt specific strategies and social technologies (Ribeiro et al., 2025). Similarly, riverine populations in other Amazonian regions are more likely to have incomplete vaccination schedules than urban populations, demonstrating that socioeconomic inequalities remain a barrier to full childhood vaccination coverage (Branco et al., 2014).

Against this backdrop, there is a lack of systematized knowledge concerning the difficulties Amazonian riverine populations face in accessing immunization. This hampers comparisons between findings from different territories and the formulation of broader recommendations for health planning. The following research question therefore emerged: what does the national and international scientific literature reveal about the barriers and strategies related to Amazonian riverine populations’ access to immunization?

This systematic review aimed to synthesize the available scientific evidence on difficulties in accessing health services with respect to vaccination coverage among Amazonian riverine populations, identifying barriers, associated factors, and strategies described in the literature.

METHODOLOGY

This systematic literature review was prepared in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) recommendations and encompassed the identification, screening, eligibility, and inclusion stages.

The research question was structured according to the PICO strategy (Population, Interest, Context): Population: riverine peoples and communities; Interest: access to the immunization/vaccination process; Context: the Brazilian Amazon region.

Searches were conducted in the Biblioteca Virtual em Saúde (BVS/LILACS), Scientific Electronic Library Online (SciELO), PubMed/PMC (National Library of Medicine), and Google Scholar databases between August and October 2024, with no language restrictions. The controlled descriptors and free-text terms “população ribeirinha,” “ribeirinhos,” “imunização,” “vacinação,” “cobertura vacinal,” and “Amazônia,” and their English equivalents, “riverine population,” “immunization,” “vaccination coverage,” and “Amazon,” were combined using the Boolean operators AND and OR.

Primary studies employing quantitative or qualitative designs or presented as experience reports were included if they were published between 2014 and 2025, were available in full, and addressed access, barriers, associated factors, or strategies related to immunization in riverine communities located in the Brazilian Amazon.

The following were excluded: studies concerning non-riverine populations or regions outside the Amazon; studies exclusively addressing animal immunization, except when associated with human health interventions such as human rabies prophylaxis; letters to the editor, editorials, and conference-proceedings abstracts without sufficient data for extraction; and duplicate records across databases.

Selection occurred in two stages: titles and abstracts were first reviewed to exclude records outside the scope of the study, after which the full texts of the preselected studies were read to verify the eligibility criteria. Following the removal of duplicates and application of the inclusion and exclusion criteria to the records identified in the four databases, eight studies comprised the final review sample. The process is summarized in Chart 1.

Chart 1

Stages of the selection process for studies included in the review

Stage	Description
Identification	Searches of BVS/LILACS, SciELO, PubMed/PMC, and Google Scholar for publications issued between 2014 and 2025, with no language restrictions
Screening	Review of titles and abstracts to exclude duplicate and out-of-scope studies, such as studies on animal vaccination or non-riverine populations
Eligibility	Full-text review of the preselected studies to verify the inclusion criteria
Inclusion	Empirical studies, whether qualitative, quantitative, or experience reports, concerning immunization access, coverage, or strategies among riverine populations in the Brazilian Amazon

Source: Data extracted from the articles included in the review and collected by the authors (2026).

The following information was extracted from the included studies: authorship and year of publication, journal, study location, methodological design, sample or focus of investigation, and main findings related to the immunization of riverine populations, as summarized in Chart 2 in the Results section.

Given the methodological heterogeneity of the included studies, a narrative synthesis of the findings was undertaken. The findings were grouped into the following emerging thematic categories: (1) geographical and logistical barriers to access; (2) factors related to the organization of health services; and (3) strategies that contribute to the immunization of riverine populations.

Because this was a systematic literature review based on previously published, publicly available secondary data, the study did not require submission to a Research Ethics Committee, pursuant to Resolution No. 510/2016 of the National Health Council, which governs research using secondary sources. Nevertheless, the copyrights of the studies consulted were respected, and the standards of the

Brazilian Association of Technical Standards (Associação Brasileira de Normas Técnicas – ABNT) were followed for citations and references.

RESULTS

Eight studies published between 2014 and 2025 were included in this systematic review. Most were conducted in the states of Pará and Amazonas. Cross-sectional and qualitative-descriptive designs predominated, alongside two experience reports. The populations studied included children, older adults, and riverine mothers covered by Riverine Primary Health Care Units (Unidades Básicas de Saúde Fluviais – UBSF) or Riverine Family Health Strategy teams. Chart 2 summarizes the characteristics of the included studies.

Chart 2
Characteristics of the studies included in the review and main findings on the immunization of riverine populations in the Brazilian Amazon

Author(s), year	Journal	Location (Amazon), sample	Design\	Main findings on immunization
Ribeiro et al. (2025)	Int. J. Environ. Res. Public Health	Careiro da Várzea, AM (floodplain); secondary PNI data from 2019–2024 and participant observation	Qualitative-descriptive case study	River logistics, the cold chain, and mediation by local health workers, as street-level bureaucrats, support vaccination coverage in floodplain areas
Branco et al. (2014)	International Journal for Equity in Health	Assis Brasil, AC (border/rural-riverine area); 282 children aged 12–59 months	Cross-sectional	Living in a rural or riverine area was associated with a greater likelihood of an incomplete vaccination schedule during the first year of life
Silva et al. (2023)	Cogitare Enfermagem	Ilha do Combú, Belém, PA; 30 riverine mothers with children of vaccination age	Qualitative-descriptive	Mothers recognize the importance of vaccination but have gaps in their knowledge of diseases and mechanisms of action; they emphasize the role of health education
Andrade et al. (2021)	Rev. Bras. Geriatria e Gerontologia	38 riverine localities in Manaus, AM; 102 older adults covered by a	Cross-sectional household survey	27.5% had not been vaccinated against influenza; lack of information (60.7%) and

		Riverine Primary Health Care Unit		access barriers (28.6%) were the most frequently cited reasons
Reis et al. (2020)	Revista Eletr�nica Acervo Sa�de	Coari, AM; monitoring of a Riverine Primary Health Care Unit (2017–2020)	Experience report	Establishment of the Riverine Primary Health Care Unit increased vaccination coverage among the most isolated population, in addition to producing other health care improvements
Silva, J.G.N. et al. (2024)	Int. J. Environ. Res. Public Health	Tapaj�s-Arapiuns Extractive Reserve, PA; 30 residents of riverine communities exposed to hematophagous bats	Participatory research	Prophylactic vaccination combined with health education reduced uncertainty about the disease and increased uptake
Morais, Celere, Meschede (2025)	Vigil�ncia Sanit�ria em Debate	Lower Amazon, PA; PNI data from 2018–2022	Descriptive epidemiological study	Rotavirus and hepatitis A vaccination coverage was below the target in a region without adequate sanitation
Camargo et al. (2025)	Anais de evento cient�fico (Even3)	Vila do Jacar� and Vila do Cuia, AM; 31 children aged 0–14 years	Cross-sectional descriptive study	67.7% had complete vaccination schedules; delays were concentrated in yellow fever and COVID-19 vaccinations

Source: Data collected by the authors, 2026.

Regarding the outcome “vaccination coverage,” quantitative findings varied according to the population and immunobiological product evaluated. Among children aged 0–14 years from riverine communities in Amazonas, 67.7% had complete vaccination schedules, with delays concentrated in yellow fever and COVID-19 doses (Camargo et al., 2025). Among children aged 12–59 months from a rural-riverine area of Acre, 82.6% had completed the basic vaccination schedule for the first year of life, with the largest shortfall occurring in doses administered after six months of age (Branco et al., 2014). Among older adults from riverine localities in Manaus, 27.5% had not been vaccinated against influenza in the year preceding the study (Andrade et al., 2021).

Regarding the reasons for non-vaccination, the studies converge around two major groups of barriers: informational barriers, comprising a lack of awareness of the need for vaccination, fear of adverse reactions, and disbelief in the protection provided; and access barriers, comprising distance, lack

of transportation, irregular service operation, and the unavailability of the immunobiological product when sought (Andrade et al., 2021; Ribeiro et al., 2025).

The qualitative studies and experience reports identified strategies that promote vaccine uptake, particularly the work of Riverine Primary Health Care Units, the mobilization of local leaders and community health workers, and educational activities intended to dispel misconceptions about vaccines (Reis et al., 2020; Silva, J.G.N. et al., 2024; Ribeiro et al., 2025).

DISCUSSION

CATEGORY 1: GEOGRAPHICAL AND LOGISTICAL BARRIERS TO ACCESSING IMMUNIZATION

The distance between riverine communities and municipal centers is the most recurrent barrier in the literature analyzed. In the Amazon, rivers are the primary transportation routes. Waterway transportation by boats, motorboats, small motorized canoes, and paddle canoes is the main means by which Amazonian populations travel and is subject to seasonal variations in water levels (Vieira et al., 2021). Consequently, access to the same community changes throughout the year: a route that is navigable during the low-water season may become longer, more hazardous, or impassable during flooding. Standardized vaccination schedules and routines do not always accommodate this rhythm.

The case study conducted in Careiro da Várzea, Amazonas, based on secondary PNI data from 2019 to 2024 and participant observation, details the implications of this situation for the program. Vaccine transportation logistics combine road and river travel, require strict cold-chain control under high temperatures, and involve journeys that may take hours. These difficulties are compounded during periods of severe flooding, when access to communities and villages becomes even more challenging (Ribeiro et al., 2025). Immunobiological products are temperature-sensitive, and every leg of the journey poses a risk to their preservation.

The vaccine that reaches a community is therefore the result of a chain of operations and local decisions, rather than merely its availability within the system. The authors consequently highlight river logistics, the cold chain, and mediation by local health workers as the pillars sustaining vaccination coverage in floodplain areas (Ferreira et al., 2021).

The quantitative findings point in the same direction. In the cross-sectional study conducted in Assis Brasil, Acre, involving 282 children aged 12–59 months, living in a rural or riverine area increased the likelihood of having an incomplete vaccination schedule during the first year of life. Although 82.6% of the children had completed the basic schedule, the shortfall was concentrated in doses administered after six months of age (Branco et al., 2014).

This pattern suggests that the difficulty lies not only in initial contact with the service, but also in maintaining engagement and returning for subsequent doses, which requires repeated travel over time. Each additional dose entails another journey, with the associated costs of time and fuel and, in many cases, the loss of a day’s work for the family. The consistency between a study published in 2014 and more recent reports indicates that territory-related vaccination vulnerability persists (Ferreira et al., 2021).

In riverine communities in Amazonas, Camargo et al. (2025) surveyed 31 children aged 0–14 years in Vila do Jacar  and Vila do Cuia and found that 67.7% had complete vaccination schedules, with delays concentrated in yellow fever and COVID-19 doses. This result shows that incompleteness is not evenly distributed across immunobiological products (Branco et al., 2014).

Because this was a descriptive study with a small sample published in conference proceedings, the delays cannot be attributed to any specific cause. Nevertheless, the finding reinforces the need to monitor coverage by vaccine and age group rather than solely through overall indicators. It also illustrates the difficulty of comparing percentages across studies because the populations, age groups, and immunobiological products evaluated differ (Andrade et al., 2021).

Taken together, these studies indicate that geographical barriers do not operate in isolation. They are compounded by the seasonality of the rivers, the vulnerability of the cold chain over long distances,

and the need for repeated visits to health services, making this a structural territorial problem rather than an individual failure on the part of families (Morais; Celere; Meschede, 2025).

CATEGORY 2: FACTORS RELATED TO THE ORGANIZATION OF HEALTH SERVICES

In addition to territorial factors, the way in which services are organized affects vaccination coverage among these populations. Vaccination-room opening hours, insufficient staff to meet demand, inadequate team training, and shortages of immunobiological products negatively affect the immunization process (Ferreira et al., 2021).

These factors have an amplified impact on riverine populations. The unavailability of vaccines when sought and the irregular operation of services, which were identified as reasons for non-vaccination (Andrade et al., 2021; Ribeiro et al., 2025), mean that, in contexts involving long and costly journeys, a wasted trip may result in a wait of weeks or months until the next opportunity. In urban areas, the same problem can usually be resolved by returning the following day.

The household survey of older riverine residents in Manaus nevertheless shows that service organization alone does not account for these gaps. Among 102 older adults covered by a Riverine Primary Health Care Unit across 38 localities, 27.5% had not been vaccinated against influenza. The most frequently cited reasons were lack of information (60.7%) and access barriers (28.6%) (Andrade et al., 2021).

This finding is relevant for two reasons. First, it shows that even people assigned to a mobile reference unit may remain unvaccinated. Second, it indicates that weaknesses in the information provided to the population carry greater weight than the access barrier itself, suggesting that increased coverage depends on both logistics and the quality of health communication. Service availability is a necessary but insufficient condition (Branco et al., 2014).

The structural dimension also appears in epidemiological data from the Lower Amazon region of Par . Between 2018 and 2022, rotavirus and hepatitis A coverage remained below the recommended targets in a region without adequate basic sanitation (Morais; Celere; Meschede, 2025).

Because this was a descriptive study, it cannot establish that sanitation conditions caused the low coverage, but the concurrence warrants attention. Rotavirus and hepatitis A are associated with hygiene and water-supply conditions. Thus, the population least likely to meet the vaccination target is also the population most exposed to environments in which these diseases circulate. Vulnerabilities therefore accumulate: reduced vaccine protection is compounded by greater environmental exposure (Andrade et al., 2021).

A final organizational issue concerns dependence on local arrangements. The Careiro da V rzea study describes local health workers as street-level bureaucrats, that is, professionals who interpret and adapt program rules to territorial realities at the point of service delivery (Ribeiro et al., 2025).

Although this mediation supports coverage, it also reveals that part of the PNI's performance in these areas rests on the resourcefulness and community ties of specific workers. This makes results vulnerable to staff changes and turnover, as well as to the lack of training identified by Ferreira et al. (2021).

CATEGORY 3: INFORMATIONAL BARRIERS, LOCAL KNOWLEDGE, AND STRATEGIES FOR INCREASING COVERAGE

The studies converge around a second group of barriers of an informational nature, including a lack of awareness of the need for vaccination, fear of adverse reactions, and disbelief in the protection provided (Andrade et al., 2021).

The study involving 30 riverine mothers from Ilha do Comb  in Bel m, Par , explores this issue in greater depth. The mothers recognize the importance of vaccination and express the need to take their children to health services, but they often do not know which diseases vaccines prevent or how

immunization works within the body. The participants themselves identified health education delivered during consultations and other forms of primary care as their principal means of accessing this knowledge (Silva et al., 2023).

This indicates that uptake does not necessarily arise from technical knowledge. Instead, practical trust in health services and professionals coexists with gaps in understanding. These gaps make vaccine uptake more vulnerable to uncertainty, rumors, or adverse events. In this regard, health education strengthens an existing willingness to be vaccinated (Morais; Celere; Meschede, 2025).

The participatory study conducted in the Tapajós-Arapiuns Extractive Reserve in Pará reinforces this interpretation. Among 30 residents exposed to hematophagous bats, human rabies prophylactic vaccination combined with educational activities intended to dispel misconceptions about the disease reduced uncertainty and increased uptake (Silva, J.G.N. et al., 2024).

In this case, vaccination becomes meaningful to the community when the risk is understood and beliefs about the disease are discussed through dialogue. Valuing local knowledge therefore means treating it as the starting point for communication, rather than merely as an obstacle to be corrected (Borburema et al., 2023).

At the service-strategy level, the establishment of Riverine Primary Health Care Units was the most structurally significant measure identified. Designed to provide basic care and expand coverage among populations living in greater isolation, these units were associated with improvements in vaccination coverage and other health care indicators in an experience report from Coari, Amazonas, which monitored the unit between 2017 and 2020 (Reis et al., 2020).

Because this was an experience report, the result indicates a promising approach but does not make it possible to quantify the effect or establish causality. The caveat raised by the Manaus survey is relevant: even among older adults covered by Riverine Primary Health Care Units, non-vaccination remained substantial (Andrade et al., 2021). These units expand access but do not guarantee it on their own and must be accompanied by communication and active outreach.

Outreach vaccination conducted door to door or through community activities is also essential to reaching populations whose members would be unlikely to receive vaccines at health facilities (Ferreira et al., 2021). Its feasibility, however, depends on the logistics described by Ribeiro et al. (2025): without a reliable cold chain and adequate river transportation, outreach vaccination cannot be sustained.

Within this arrangement, Community Health Workers (Agentes Comunitários de Saúde – ACS) occupy a central position. Because health teams are often unfamiliar with riverine territories, the ACS serves as the essential link between health services and the community and is indispensable to active outreach (Borburema et al., 2023). Continuing health education is an important tool for ensuring the quality of this work because it improves practices, encourages health promotion, and adapts services to the needs of groups with distinctive characteristics, such as riverine populations (Ferreira et al., 2021).

FINAL CONSIDERATIONS

This systematic review brought together eight studies on the immunization of Amazonian riverine populations and showed that difficulties in access do not have a single cause, but arise from a combination of territorial, organizational, and informational factors.

At the territorial level, the distance from municipal centers, dependence on river transportation, and river seasonality make both vaccine delivery and families' return visits to health services costly and uncertain processes. Maintaining the cold chain over long journeys and the need for repeated travel to complete vaccination schedules help explain why gaps are concentrated in certain doses and immunobiological products rather than being evenly distributed. At the organizational level, the irregular operation of vaccination rooms, insufficient staffing, and shortages of immunobiological products have an amplified impact in this context because one missed opportunity may mean waiting weeks for the next. Gaps in information about the importance and functioning of vaccination, in turn, weaken uptake, which is often based more on trust in professionals than on an understanding of the diseases prevented. Data

from the Lower Amazon further indicate that low rotavirus and hepatitis A coverage coincides with inadequate sanitation, suggesting an overlap between vaccination and environmental vulnerability.

Conversely, the studies identify territory-based strategies that promote coverage: Riverine Primary Health Care Units, outreach vaccination, and the work of Community Health Workers, supported by continuing health education. These strategies appear more effective when combined with educational activities that engage with local knowledge and beliefs, as in the case of rabies vaccination in the Tapajós-Arapiuns Extractive Reserve. It should be emphasized, however, that Riverine Primary Health Care Units expand access but do not guarantee it on their own, as substantial non-vaccination was found even among older adults covered by this service in Manaus. Moreover, part of the program's performance in these areas depends on mediation by local health workers, reinforcing the need to invest in training, resources, and protocols that reduce dependence on individual efforts.

The limitations include the small number of studies and heterogeneity in study design, population, immunobiological product, and outcome, which prevent direct comparisons between percentages and hinder the generalization of findings to the Amazon as a whole. Cross-sectional and qualitative-descriptive studies with small samples predominated, together with two experience reports, which limits causal inference. The areas studied were also concentrated in a small number of municipalities in Pará, Amazonas, and Acre. Relevant studies not indexed in the databases consulted may also have been missed.

Nevertheless, the synthesis presented here may inform public-policy development and the planning of immunization initiatives that are more responsive to the distinctive characteristics of riverine populations. Particular emphasis should be placed on integrating river logistics, service organization, health communication, and respect for local knowledge in accordance with the SUS principles of equity and comprehensive care. Further primary studies employing analytical designs and evaluating the impact of Riverine Primary Health Care Units and outreach vaccination on coverage are recommended, as are future reviews that broaden the temporal and geographical scope of the scientific literature on this subject.

REFERENCES

- Andrade, A. B. C. A. de; Albuquerque, B. C. de; Garnelo, L.; Herkrath, F. J. Vacinação contra a influenza autorreferida por idosos de áreas rurais ribeirinhas: implicação potencial dos achados frente à pandemia de covid-19 no Amazonas [Self-reported influenza vaccination among older adults in rural riverine areas: potential implications of the findings in light of the COVID-19 pandemic in Amazonas]. *Revista Brasileira de Geriatria e Gerontologia*, v. 24, n. 3, e210094, 2021. Available at: <https://doi.org/10.1590/1981-22562021024.210094>. Accessed on: 12 Sept. 2026.
- Barbosa, L. F. et al. Recusa vacinal e o impacto no ressurgimento de doenças erradicadas [Vaccine refusal and its impact on the resurgence of eradicated diseases]. *Brazilian Journal of Surgery and Clinical Research – BJSCR*, v. 32, n. 1, p. 2317-4404, 2020.
- Borburema, M. M. et al. Fatores que interferem na cobertura vacinal no SUS: uma revisão integrativa [Factors affecting vaccination coverage in SUS: an integrative review]. *Saúde Coletiva* (Barueri), v. 13, n. 88, p. 13503–13510, 2023.
- Branco, F. L. C. C. B.; Pereira, T. M.; Delfino, B. M.; Braña, A. M.; Oliart-Guzmán, H.; Mantovani, S. A. S.; Martins, A. C.; Oliveira, C. S. de M.; Ramalho, A. A.; Codeço, C. T.; Silva-Nunes, M. da. Socioeconomic inequalities are still a barrier to full child vaccine coverage in the Brazilian Amazon: a cross-sectional study in Assis Brasil, Acre, Brazil. *International Journal for Equity in Health*, v. 13, n. 118, 2014. Available at: <https://doi.org/10.1186/s12939-014-0118-y>. Accessed on: 15 Sept. 2026.
- Camargo, C. S.; Magalhães, A. B. de; Oliveira, J. C. P. de; Yamaoka, L. M. M.; Ramos, M. A.; Lima, M. J. F. de; Tabuti, R. Y. T.; Zanelato, E.; Tedeschi, J. S. Avaliação da situação vacinal da população infantil às margens do rio Solimões: estudo nas comunidades ribeirinhas da Vila do Jacaré e Vila do Cuia [Assessment of the vaccination status of children living along the Solimões River: a study in the riverine communities of Vila do Jacaré and Vila do Cuia]. *Anais de evento científico*, 2025. Available at: <https://static.even3.com/anais/1298782.pdf>. Accessed on: 20 Sept. 2026.

- Ferreira, D. S. et al. Nurses' educational practices in Family Health Strategy. *Revista Brasileira de Enfermagem*, v. 74, n. 2, e20200045, 2021. Available at: <https://doi.org/10.1590/0034-7167-2020-0045>.
- Morais, C. G.; Celere, B. S.; Meschede, M. S. C. Cobertura vacinal de rotavírus e hepatite A em uma região na Amazônia desprovida de saneamento satisfatório [Rotavirus and hepatitis A vaccination coverage in an Amazonian region lacking adequate sanitation]. *Vigilância Sanitária em Debate*, Rio de Janeiro, v. 13, e02284, 2025. Available at: <https://doi.org/10.22239/2317-269X.02284>. Accessed on: 20 Sept. 2026.
- Motta, J. R. da et al. Comunicação pública e campanhas nacionais de vacinação em contexto de mediatização: as estratégias comunicacionais do Ministério da Saúde na crise da cobertura vacinal de 2018 [Public communication and national vaccination campaigns in the context of mediatization: the Ministry of Health's communication strategies during the 2018 vaccination-coverage crisis]. *Repositório BC UFG*, 2020. Available at: <https://repositorio.bc.ufg.br/tede/handle/tede/10844>. Accessed on: 12 Sept. 2026.
- Reis, M. H. da S.; Portugal, J. K. A.; Mariño, J. M.; Barros, W. da S.; Dantas, J. de S.; Souza, T. T. G. de; Reis, Y. da S. dos; Germano, S. N. F.; Barão, É. J. da S.; Freitas, D. L. A. de. O impacto do advento de uma Unidade Básica de Saúde Fluvial na assistência aos povos ribeirinhos do Amazonas [The impact of establishing a Riverine Primary Health Care Unit on health care for riverine peoples in Amazonas]. *Revista Eletrônica Acervo Saúde*, n. 53, e3631, 2020. Available at: <https://doi.org/10.25248/reas.e3631.2020>. Accessed on: 18 Sept. 2026.
- Ribeiro, H.; Lima, J. A. de; Neta, A. A.; Assis, S. M. C.; Rodrigues, B. de O. Access to Vaccines in Floodplains and Hard-to-Reach Areas of the Brazilian Amazon: The Contribution of Street-Level Bureaucrats and the Use of Social Technologies. *International Journal of Environmental Research and Public Health*, v. 22, n. 5, p. 680, 2025. Available at: <https://doi.org/10.3390/ijerph22050680>. Accessed on: 20 Sept. 2026.

- Silva, L. B. da et al. Knowledge of primary health care professionals on health policies for the riverside population. *Revista Brasileira de Enfermagem*, v. 73, n. 5, e20190080, 2020. Available at: <http://dx.doi.org/10.1590/0034-7167-2019-0080>. Accessed on: 18 Sept. 2026.
- Silva, R. L. S. da; Santos, E. R. de A. dos; Silva, E. M. R. da; Rodrigues, I. L. A.; Andrade, E. G. R. de; Nogueira, L. M. V. Saberes e práticas de mães ribeirinhas sobre vacinação [Knowledge and practices of riverine mothers regarding vaccination]. *Cogitare Enfermagem*, v. 28, e88275, 2023. Available at: <https://doi.org/10.1590/ce.v28i0.88275>. Accessed on: 19 Sept. 2026.
- Silva, J. G. N.; Silva, S. de S.; Gomes, T. C. M.; Nascimento, G. dos S.; Valentim, L. de A.; Quaresma, T. C.; Fernandes, F. de P.; Oliveira, S. M. S. de; Moraes, W. P. Empowering Riverine Communities in the Amazon: Strategies for Preventing Rabies. *International Journal of Environmental Research and Public Health*, v. 21, n. 1, p. 117, 2024. Available at: <https://doi.org/10.3390/ijerph21010117>. Accessed on: 20 Sept. 2026.
- Vieira, N. F. C. et al. Fatores presentes na satisfação dos usuários na Atenção Básica [Factors affecting user satisfaction with primary care]. *Interface* (Botucatu), v. 25, e200516, 2021. Available at: <https://doi.org/10.1590/interface.200516>.
- Xiao, X. Not doomed: examining the path from misinformation exposure to verification and correction in the context of COVID-19 pandemic. *Telematics and Informatics*, 2022. Available at: <https://doi.org/10.1016/j.tele.2022.101890>.