



Perceived barriers to respiratory syncytial virus vaccination and vaccination coverage among pregnant women: A cross-sectional study

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ABSTRACT

Introduction. Argentina introduced maternal vaccination against respiratory syncytial virus (RSV) in 2024 to prevent severe respiratory infections in infants. To ensure satisfactory vaccination rates, it is important to identify barriers to its implementation.

Objective. To identify barriers to RSV vaccination among pregnant women. We estimated RSV vaccination coverage and the potential association between coverage and barriers.

Population and methods. A cross-sectional study based on a survey of mothers who were eligible to receive the RSV vaccine. We developed and validated a tool to identify structural, informational, emotional, and social barriers. We used logistic regression for univariate and multivariate analyses.

Results. We surveyed 216 mothers. RSV vaccine coverage was 43.7%. In the univariate analysis, fewer than 5 prenatal visits and not receiving clear information were associated with lower vaccination rates. In the multivariate analysis, knowledge of the RSV vaccine was the only factor independently associated with vaccination coverage (adjusted OR: 3.4; 95% CI: 1.9-6.2; $p < 0.001$).

Conclusion. RSV vaccination coverage among pregnant women was lower than that for other vaccines recommended during pregnancy. We identified limited vaccine availability and limited knowledge about the vaccine as factors associated with non-vaccination. Strengthening information and recommendations during prenatal care could help improve vaccination coverage. This study provides a validated tool for assessing barriers to vaccination among pregnant women.

Keywords: *pediatrics; vaccines; human respiratory syncytial virus; respiratory diseases; viral bronchiolitis.*

doi: <http://dx.doi.org/10.5546/aap.2026-11029.eng>

To cite: Souto SM, Rodríguez MA, Torres FA, Domínguez PA, Amaya GH. Perceived barriers to respiratory syncytial virus vaccination and vaccination coverage among pregnant women: A cross-sectional study. *Arch Argent Pediatr.* 2026;e202611029. Online ahead of print 22-OCT-2026.

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Funding: None.

Conflict of interest: None.

Received: 1-19-2026

Accepted: 8-28-2026



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INTRODUCTION

Respiratory syncytial virus (RSV) remains a major global health problem.^{1,2} It is estimated that about 50% of infants become infected with RSV during their first year of life. Although children with risk factors—such as prematurity, chronic lung or heart disease—are more likely to be hospitalized, the high prevalence of the virus means that a significant number of full-term infants also require medical care.^{3,4}

Currently, two strategies prevent RSV disease: passive immunization with monoclonal antibodies and active immunization through maternal vaccination during pregnancy.⁵ In Argentina, these strategies are implemented in a complementary manner. Palivizumab—a monoclonal antibody indicated for high-risk infants during peak viral circulation—has been available for years.⁶ More recently, nirsevimab, a long-acting monoclonal antibody, was added.⁷ On the other hand, the RSV vaccine for pregnant women was added to the National Immunization Schedule (CNV, by its Spanish acronym) in January 2024.⁸ However, during the first year of implementation, the vaccination strategy took place between March and August 2024. In 2025, the Ministry of Health moved the campaign start date up to January.^{9,10} This is a bivalent prefusion F (RSVpreF) vaccine, indicated between 32.0 and 36.6 weeks of gestation during the winter season.¹¹

Vaccination during pregnancy has the greatest potential for population-wide impact, as it provides broad, timely, and sustainable protection for newborns; however, its effectiveness depends largely on achieving high vaccination coverage.¹² Despite the scientific evidence supporting the efficacy and safety of the vaccines included in the CNV, achieving optimal vaccination coverage remains a challenge, particularly among pregnant women.¹³ Vaccination during pregnancy is influenced by multiple factors, including personal aspects—such as emotions (fear, anxiety, insecurity, mistrust), values, risk perception, misconceptions, or beliefs—and social, cultural, political, and historical determinants.¹⁴ Some of the barriers to vaccination during this period include a perceived lack of safety, the belief that the vaccine is unnecessary or ineffective, the absence or inconsistency of recommendations from healthcare providers, a lack of knowledge about the disease and/or the vaccine, and difficulties in accessing the vaccine.^{15,16} Furthermore, logistical barriers can also play a key role in low vaccination

rates during pregnancy.¹⁷

Since the RSV vaccine was recently added to the CNV, information on its coverage and the barriers to its acceptance in Argentina is still limited. This study aims to provide local evidence on these issues.

In this context, the primary objective was to identify barriers to RSV vaccination among pregnant women attending a hospital in Argentina. In addition, the study estimated vaccination coverage for RSV and other recommended vaccines during pregnancy and explored the association between the identified barriers and RSV vaccination.

POPULATION AND METHODS

Design

A cross-sectional, survey-based study. To achieve the objectives, we developed and validated a tool to identify barriers to vaccination.

Population

The study included mothers of children under 2 years of age who were treated at Hospital General de Niños Pedro de Elizalde between May and October 2025, were scheduled to receive the RSV vaccine, and consented to participate. Because the RSV vaccine is administered between 32.0 and 36.6 weeks of gestation, the interval between vaccination and questionnaire administration could range from about one month before birth to 18 months afterward.

Mothers who had any contraindications to receiving the vaccine (pregnancy outside the recommended period, history of serious adverse events) were excluded. We used a subsample of the population to develop and initially validate the questionnaire, and administered the final version to the remaining participants.

Data

We obtained data from the questionnaire administered to participants and from maternal vaccination records.

Questionnaire

A literature review (PubMed, last 5 years) identified domains of barriers to vaccination among pregnant women. Based on this evidence, we developed an initial set of 30 items rated on a 1-5 Likert scale. Two experts assessed content validity and calculated the expected content validity index (overall = 0.8). We then conducted a pilot study (n = 24) to evaluate comprehension,

response time, and gather suggestions, and estimated internal consistency (Cronbach's $\alpha = 0.72$). The psychometric analysis included item response theory analysis (IRT) and test-retest reliability (intraclass correlation coefficient for continuous items between 0.50 and 0.60; weighted kappa coefficient for ordinal items between 0.5 and 0.8). We explored construct validity using exploratory and confirmatory factor analysis, as well as known-group validity. After the final review, we administered the questionnaire (25 items) to an expanded sample ($n = 70$) to confirm its metric properties before the main study (*Supplementary material*).

Outcome variable

Vaccination coverage during pregnancy against RSV (primary) and influenza-DTPa (secondary), based on the maternal vaccination record.

We also recorded the mother's perceived reasons for not receiving the RSV vaccine (predefined categories; see *Supplementary material*).

Predictive variables

The barriers to vaccination identified in the survey were considered predictors:

- Access to health services: prenatal visits (<5).
- Structural barriers: distance to the vaccination center (more than 30 minutes from home), vaccine availability at the time of the appointment, and convenient vaccination center hours.
- Information barriers: perceived clarity of the information received about vaccines (very confusing/confusing/clear/very clear), knowledge of the RSV disease, awareness about the RSV vaccine, and perceptions of the adequacy of vaccination campaigns.
- Attitudinal or emotional barriers: fear of getting vaccinated during pregnancy and trust in the healthcare system.
- Social or cultural barriers: the influence of family/community opinions on their decision to get vaccinated.

Control variables

We considered maternal age, number of children, nationality, place of residence, health insurance coverage, highest level of education attained, and occupation as potential confounders.

Statistical considerations

We performed descriptive analyses using proportions with 95% confidence intervals (95% CI) for categorical variables and the mean with standard deviation (SD) or the median with interquartile range (IQR), depending on normality (Kolmogorov-Smirnov test), for quantitative variables. To explore associations, we used the chi-square test or Fisher's exact test for categorical variables and Student's t-test or the Mann-Whitney U test for quantitative variables, as appropriate. We considered $p < 0.05$ statistically significant. We used binary logistic regression to identify factors independently associated with lack of RSV vaccination. We included variables with $p < 0.20$ in the bivariate analysis and those considered clinically relevant in the model. We observed no multicollinearity among the independent variables (variance inflation factor: 1.02 to 1.09). We expressed results as odds ratios (OR) with 95% CI. We analyzed the data using IBM SPSS Statistics 22®.

Sample size and sampling

Following recommendations from the literature on preliminary instrument validation studies, we estimated a sample size of 70 participants for the questionnaire's psychometric evaluation.¹⁸ This validation was conducted on a sample independent of the one used in the main study.

Finally, we estimated the sample size to detect differences in the frequency of at least one barrier between vaccinated and unvaccinated women, assuming an absolute difference of 15%, 80% power, and a 95% confidence level. Because the proportion of vaccinated women was unknown when the study was designed, we proposed a minimum sample size of 160 participants to ensure sufficient numbers in both groups (vaccinated and unvaccinated) for the planned exploratory analysis.

We performed the calculation using EpiInfo 7.1® (CDC). Non-probabilistic convenience sampling was used. During the inclusion period, we selected 20 business days by simple random sampling, and on each day, we invited at least 16 mothers of hospitalized patients to participate.

Ethical considerations

The Institutional Ethics Committee approved the protocol (Registration No. 15978). We requested and obtained informed consent from all participants.

RESULTS

We administered 216 surveys. The mean age of the mothers was 27.9 years (SD 6.4); 89.8% were Argentine nationals, and 90.7% resided in the province of Buenos Aires. RSV vaccination coverage was 43.7% (Table 1). The sociodemographic variables assessed did not differ between the vaccinated and unvaccinated groups, except for age (Table 2).

When assessing barriers to vaccination, the univariate analysis showed that having ≥ 5 prenatal visits during pregnancy (OR: 5.6; 95% CI: 1.2-25.5; $p = 0.01$), being aware of the RSV vaccine (OR: 3.9; 95% CI: 2.2-6.9; $p = 0.01$), and receiving a vaccination recommendation from a healthcare professional (OR: 4.3; 95% CI: 2.5-

7.7; $p < 0.001$) were associated with higher RSV vaccination coverage (Table 3).

Among mothers who did not receive the RSV vaccine, the most frequently cited reason was "it was not offered to me," mentioned by 89.3% of the participants (95% CI: 82.3-96.3).

In the multivariate analysis, awareness of the RSV vaccine was independently associated with a higher probability of vaccination during pregnancy (adjusted OR: 3.4; 95% CI: 1.9-6.2; $p < 0.001$). The model showed adequate overall fit (Table 4). Although vaccine administration by a healthcare professional showed a strong association in the univariate analysis, this association did not hold after multivariate adjustment. Because we observed no multicollinearity, this suggests the

TABLE 1. Population characteristics (n = 216)

	n	Percentage (%)	95% CI
Mean age (SD)	27.9	6.4	
Argentine nationality	194	89.8	85.8-93.9
Living in Buenos Aires province	196	90.7	86.8-94.6
Educational level			
Elementary incomplete	1	0.5	0-1.4
Elementary complete	14	6.5	3.2-9.8
Secondary incomplete	95	44	37.4-50.6
Secondary complete	87	40.3	33.8-46.8
Higher education	19	8.8	5.0-12.6
Having other children	147	68.1	61.9-74.31
Number of children (median, IQR)	2 (1-3)		
Occupation			
Informal work	39	18.1	3.8-23.2
Formal work	14	6.5	3.2-9.8
Housewife	154	71.3	65.3-77.3
Student	9	4.2	1.5-6.9
Public health insurance only	169	78.2	72.7-83.7
Prenatal visits (≥ 5)	195	90.3	86.3-94.3
RSV vaccine administered	94	43.7	37.1-50.3
Flu vaccine administered	173	80.1	74.8-85.4
DTaP vaccine administered	175	81	75.8-86.2

SD: standard deviation; IQR: interquartile range; RSV: respiratory syncytial virus.

TABLE 2. Univariate analysis (control variables and adherence to respiratory syncytial virus vaccination)

	With RSV vaccine (n = 94) n (%)	Without RSV vaccine (n = 121) n (%)	OR	p-value
Maternal age (mean and SD)	28.9 (6.5)	27.2 (6.4)		0.05*
Having other children	65 (69.1)	81 (66.9)	1.1 (0.6-1.9)	0.7**
Argentine nationality	84 (89.4)	110 (90.9)	0.84 (0.3-2.07)	0.8**
Living in Buenos Aires province	85 (90.4)	111 (91.7)	0.7 (0.3-2.1)	0.6**
Having health insurance	18 (19.1)	29 (24.0)	0.75 (0.3-1.4)	0.4**
Higher education	10 (10.6)	9 (7.4)	1.5 (0.5-3.8)	0.4

* Student's test for independent samples.

** Chi-square test.

SD: standard deviation; RSV: respiratory syncytial virus.

effect was not independent of the other factors in the model.

Regarding influenza and DTaP vaccination during pregnancy, high coverage rates were observed for both (80.1% and 81%, respectively). In the univariate analysis, we found no statistically significant and consistent associations between lack of vaccination and the sociodemographic variables and potential barriers evaluated, except for having more than 5 prenatal visits during pregnancy (*Table 5*).

DISCUSSION

The inclusion of RSV vaccination in the National Immunization Schedule (NIS) in 2024 aims to reduce morbidity and mortality for acute lower respiratory tract infections in infants, especially those under 6 months of age.⁸ Our results show a coverage rate of 43.7%, which is lower than the 61.7% coverage rate in the

province of Buenos Aires reported by the National Ministry of Health.¹⁹ This difference may be because our study evaluated a specific sample of mothers receiving care at a single center, whereas official estimates incorporate data from a broader population. Razzini *et al.* reported a coverage rate of 34.9% during the first season of implementation.²⁰ Similar results were reported by Gentile *et al.* (31.5% coverage).²¹ During the 2023–2024 season in the United States, coverage reached 32.6%, with even lower rates among those with public health insurance.²²

One of this study's most significant contributions is identifying a marked disparity in coverage among the vaccines recommended during pregnancy. While coverage rates for influenza and DTaP exceeded 80%, RSV vaccination was considerably lower. This difference suggests that the barriers are not primarily structural—in terms of access to the

TABLE 3. Association between predictors and vaccination adherence

	With RSV vaccine (n = 94) n (%)	Without RSV vaccine (n = 121) n (%)	OR	p- value
≥5 prenatal visits	90 (95.7)	104 (86.0)	5.6 (1.2-25.5)	0.01
Distance to the vaccination site (>30 min)	21 (22.3)	35 (28.9)	0.7 (0.4-1.3)	0.3
Vaccine availability	79 (84.0)	90 (74.4)	1.3 (0.6-2.7)	0.4
Convenient vaccination center hours	86 (91.5)	105 (86.8)	0.9 (0.3-2.7)	0.5
Receiving information about vaccines	63 (67.0)	70 (57.9)	1.5 (0.8-2.6)	0.2
Knowing about bronchiolitis	71 (75.5)	86 (71.1)	1.3 (0.7-2.3)	0.5
To be familiar with the RSV vaccine	62 (65.9)	40 (33.1)	3.9 (2.2-6.9)	0.001
Adequate public awareness campaigns	44 (46.8)	45 (37.2)	1.46 (0.8-2.5)	0.1
Fear of vaccination	22 (23.4)	25 (20.7)	1.2 (0.6-2.2)	0.7
Trusting in HP	73 (77.7)	94 (77.7)	1 (0.5-1.9)	0.9
HP offered the RSV vaccine	64 (68.1)	40 (33.1)	4.3 (2.5-7.7)	0.001

HP: healthcare professional; RSV: respiratory syncytial virus.

TABLE 4. Factors associated with respiratory syncytial virus vaccination during pregnancy. Multivariate analysis

Variable	Adjusted OR	95% CI	p- value
Maternal age (years)	1.1	0.9-1.1	0.1
≥5 pregnancy visits	4.1	0.8-19.5	0.08
Receiving information about vaccines during pregnancy	1.1	0.5-2.1	0.8
Knowing about the RSV vaccine	3.4	1.9-6.2	<0.001
Adequate information campaigns	1.1	0.7-1.7	0.6
HP offered the RSV vaccine	1.2	0.7-1.8	0.4

HP: healthcare professional; RSV: respiratory syncytial virus.

TABLE 5. Barriers identified regarding non-vaccination against influenza and DTaP during pregnancy

Variable	Flu vaccine (Yes/no)	OR (95% CI)	DTaP vaccine (Yes/no)	OR (95% CI)
n	173/43		175/41	
Having other children	113/34	2.1 (0.9-4.4)	119/28	0.9 (0.4-2.1)
Argentine nationality	152/42	5.8 (0.7-44.4)	158/36	1.3 (0.4-3.7)
Living in Buenos Aires province	157/39	1.3 (0.4-4.7)	160/37	0.8 (0.3-2.7)
Having health insurance	134/35	1.3 (0.5-2.9)	136/33	1.1 (0.5-2.8)
Higher education	17/2	2.2 (0.5-10.1)	160/37	0.8 (0.2-2.7)
≥5 prenatal visits	163/32	4.4 (1.5-13.2)*	165/30	3.6 (1.2-11.1)*
Distance to the vaccination center (>30 min)	44/12	0.8 (0.4-1.8)	40/16	0.5 (0.2-0.9)*
Receiving information about vaccines	61/21	1.7 (0.8-3.4)	63/19	1.5 (0.7-3.1)
Fear of vaccination	42/5	2.4 (0.9-6.8)	36/11	0.7 (0.3-1.5)
Trusting the HP	135/32	1.2 (0.5-2.6)	140/27	2.1 (0.9-4.3)

HP: healthcare professional.

* $p < 0.05$.

healthcare system or vaccine availability—but rather are linked to the still-incomplete integration of this new indication into routine clinical practice.

In line with this, Dubé et al. point out that the impact of a new vaccine immunization program depends on its acceptance, timely access, and the gradual achievement of high coverage rates.²³ Furthermore, a study conducted in the United States—based on data from 2017 to 2021 and before the availability of the RSV vaccine—showed a downward trend in coverage rates for established maternal vaccines, such as DTaP and the flu vaccine.²⁴ Although these findings cannot be directly extrapolated to the Argentine context, they highlight the importance of strengthening vaccination recommendation strategies during pregnancy.

In addition, adequate prenatal care (more than five visits during pregnancy), an explicit recommendation from a healthcare professional, and access to clear information were associated with a higher likelihood of RSV vaccination. Among unvaccinated individuals, the most frequently cited reason was a lack of vaccine offer during pregnancy, highlighting professional recommendation as a key factor for vaccination. These findings are consistent with the recommendations of the World Health Organization's Strategic Advisory Group of Experts on Immunization, which emphasize the importance of specific strategies to strengthen maternal vaccination.²⁵ Furthermore, prior knowledge about the vaccine during pregnancy was positively associated with vaccination. At the same time, perceptions of specific campaigns

showed no significant association, suggesting that personalized information provided during prenatal care had a greater impact. These findings are consistent with those reported in the United States and the United Kingdom during the early phases of implementing maternal RSV vaccination, where a lack of recommendations from healthcare professionals and limited awareness of the vaccine's indications were identified as the main barriers.^{17,22} In our population, information-related barriers were particularly significant, as knowledge about the vaccine was the only factor independently associated with vaccination in the multivariate analysis. Unlike some international studies, concerns about vaccine safety did not emerge as a predominant barrier, suggesting that, in our context, opportunities for information and recommendations during prenatal care may have a greater impact on coverage than perceptions of vaccine safety.

Although the healthcare professional's recommendation of the vaccine showed a strong association in the univariate analysis, this association did not hold up after multivariate adjustment. Because no multicollinearity issues were observed among the variables in the model, this finding may indicate that the effect of the professional's recommendation was not independent of other factors, particularly vaccine knowledge.

One limitation is that the information was obtained through a questionnaire administered up to 18 months after pregnancy, so that some responses may have been subject to recall bias.

The fact that nearly 40% of vaccinated

individuals had not formed an opinion about the vaccine's safety and yet agreed to receive it underscores the importance of professional advice in decision-making.

Overall, the findings show that mandatory, free vaccines are not enough to ensure optimal coverage unless active medical recommendations and adequate prenatal follow-up accompany them. Given that the main reason cited for not receiving the vaccine was not being offered it during pregnancy, strategies are needed to increase opportunities for recommendations and vaccination. These could include specific training for the healthcare team involved in prenatal care, adding alerts or reminders in medical records when vaccination is indicated, and, when feasible, administering the vaccine at the same facility where prenatal care is provided. These interventions could help improve RSV vaccination coverage and, consequently, reduce childhood morbidity and mortality associated with this virus.

CONCLUSION

Vaccination coverage against RSV among pregnant women was lower than that observed for other vaccines recommended during pregnancy. The lack of vaccine availability and awareness of the vaccine were identified as significant factors associated with non-vaccination. Strengthening information and recommendations during prenatal care could help improve vaccination coverage. In addition, this study provides a validated tool for assessing barriers to vaccination among pregnant women. ■

The supplementary material provided with this article is presented as submitted by the authors. It is available at: https://www.sap.org.ar/docs/publicaciones/archivosarg/2027/11029_AO_Souto_Anexo.pdf

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