

# National survey for pediatricians in Argentina: Vaccination in daily practice, perception of knowledge and barriers

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## ABSTRACT

**Introduction.** The decline in vaccination coverage has been very significant in the past decade. Pediatricians play a key role in catching-up coverage and increasing confidence in vaccination.

**Objectives.** To describe pediatricians' perceptions of vaccine knowledge and practices and to identify barriers to access.

**Methods.** Observational, analytical study using an online survey. Variables related to professional profile, training and barriers to vaccination were included.

**Results.** A total of 1696 pediatricians participated (response rate: 10.7%). Their mean age was 50.4 years; 78.7% were women; 78.2% had  $\geq 10$  years of experience; 78.4% provided outpatient care and 56.0%, in the private subsector; and 72.5% received training in the past 2 years.

Respondents described themselves as "trained" in convey the following aspects to their patients: benefits of vaccines: 97.2%; campaign objectives: 87.7%; contraindications: 82.4%; adverse effects: 78.9%; catch-up vaccination: 71.2%; reporting of events supposedly attributable to vaccination or immunization: 59.5%. The proportion was statistically higher in all aspects, among pediatricians with  $\geq 10$  years of experience and those who received training recently ( $p \leq 0.01$ ).

The barriers identified in access to vaccination were false contraindications (62.3%), temporary vaccine shortage (46.4%), cultural reasons (41.4%), and restricted vaccination center hours (40.6%).

**Conclusions.** The perception of the level of training varied depending on the vaccination-related aspect. Pediatricians with more years of professional experience and those who received recent updates perceived themselves as more trained. Multiple barriers associated with access to vaccination were identified.

**Keywords:** vaccination coverage; pediatricians; vaccination schedules; barriers in access to health care services; surveys, and questionnaires.

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## INTRODUCTION

Vaccines are one of the most beneficial health measures for humankind because they prevent diseases that previously caused major epidemics, deaths, and sequelae.<sup>1</sup>

The negative impact of the SARS-CoV-2 pandemic on the coverage of vaccines included in the national vaccination schedule was significant in the entire population, especially in children. In 2020, the national vaccination coverage decreased an average of 10 points for all vaccines compared to the average for the period between 2015 and 2019, when coverage was already declining.<sup>2,3</sup> During 2021, a slight catch-up was observed in all age groups, but pre-pandemic levels have not been reached; therefore, coverage does not allow to achieve the objective of collective immunity or “herd immunity”.<sup>4</sup>

The cause of the drop in vaccination coverage is multifactorial. Some factors that are worth noting include those related to access, the decrease in medical consultations that facilitate vaccine indications, false contraindications, lack of knowledge or low perception of risk on the part of the population. In addition, factors related to the lack of trust, not only in vaccines, but also in the healthcare system, have been identified.<sup>2</sup>

The objective of this study was to describe the perception of pediatricians of their knowledge and practices regarding vaccines in patient care and to identify the barriers in access to vaccination in Argentina.

## METHODS

This was an analytical, observational, cross-sectional study using an online self-administered questionnaire. The population included pediatricians who were members of the Sociedad Argentina de Pediatría (SAP). Pediatricians who were not actively involved in healthcare activities were excluded. The questionnaire was distributed only via the SAP's official e-mail account.

Variables related to the pediatrician's profile were recorded, such as demographic data (age, sex, place of residence), years of professional experience, subspecialty, area of care (urban, rural, or semi-rural), main type of care provided (outpatient, on-call, or inpatient), and care subsector in which they worked (public or private). The survey included questions related to training in vaccination: source of information used for updates, time elapsed since the most recent formal update, existence of sources to

receive updated information regarding specific vaccination campaigns, and vaccine coverage in the region where they work.

Participants were also asked about the availability of an expert whom they could ask about vaccination, the perception of their ability to explain to patients and their families different vaccination-related topics: vaccine benefits, contraindications, potential adverse effects; reporting of adverse event following immunization (AEFI), catch-up vaccinations, and objectives of specific vaccination campaigns.

Other aspects about daily practice included the habit of reviewing the vaccination records of all family members and difficulties in relation to office visit time and legibility of vaccination cards. Finally, the perception of potential barriers to vaccination was explored. Barriers were classified according to whether they were related to the vaccination center, its training, and the families.

## Questionnaire validation

The REDCap tool was used to develop the questionnaire.<sup>5</sup> The questionnaire format was validated in a sample of 5 pediatricians, who were SAP region directors, to ensure that it was understandable, relevant, and appropriate for the study participants. Subsequently, a test-retest reliability analysis was carried out in 20 pediatricians who completed the questionnaire twice, 1 week apart, to assess each item's degree of correlation and stability.

The *Annex* corresponds to the final survey version (*Supplementary material*).

## Data analysis

Continuous variables were described as mean and standard deviation (SD), while categorical variables were expressed as frequency and 95% confidence intervals (95% CI) for collected data. In addition, the following associations were analyzed using odds ratios (OR) and their 95% CI: i) pediatrician profile and time since their most recent update on vaccination; ii) pediatrician profile and perceived ability to explain aspects of vaccines and use of office visit time; iii) time since the most recent update on vaccination and perceived ability to explain vaccine-related aspects.

Potential confounding factors were assessed using a multiple logistic regression model.

Data were analyzed using the STATA, version 14, statistical software package.

This study was approved by the Research

Ethics Committee and the Research Teaching Committee of Hospital de Niños Dr. Ricardo Gutiérrez (PRIISA no.: 7532).

## RESULTS

Between October and December 2022, 16 334 pediatricians received the questionnaire via the SAP's newsletter e-mail account. A total of 1746 pediatricians completed the questionnaire (response rate: 10.7%); of these, 50 were excluded (22 were not actively working and 28 did not practice medicine); therefore, 1696 surveys were analyzed.

It was noted that 45% of respondents worked in the Metropolitan region; 78.4% provided mainly outpatient care and worked in the private

subsector (56.0%); 78.6% had 10 years or more of professional experience (*Table 1*).

*Table 2* details the aspects related to the sources of information and updates on vaccination.

When asked about the possibility of clearing doubts about vaccines, 22.9% (n = 384) of respondents indicated that they did not have an expert representative available. Among those who had expert for consultations, 56.9% (n = 965) said such representative was a colleague; 26.1% (n = 442) a vaccinator; and 8.8% (n = 136) someone else. The analysis showed that having 10 or more years of professional experience was significantly associated with having received formal training about vaccines in the past 2 years

**TABLE 1. Demographic and professional characteristics. N = 1696**

Age (years)		Mean 50.4 (SD 15.2)
Sex	Female	1325 (78.7)
	Male	357 (21.2)
	Would rather not answer	1 (0.1)
Years of experience as pediatrician	Less than 5 years	174 (10.3)
	5 to 9 years	186 (11.1)
	10 to 20 years	444 (26.4)
	More than 20 years	878 (52.2)
SAP region	Metropolitan region	247 (14.7)
	Center-Cuyo region	210 (12.4)
	Litoral region	210 (12.4)
	Northwest region	120 (7.1)
	South Pampa region	109 (6.5)
	Northeast region	81 (4.8)
	North Pampa region	56 (3.3)
	Atlantic Patagonia region	52 (3.1)
	Andean Patagonia region	49 (2.9)
Main area of care*	Urban	1609 (94.9)
	Semi-rural	129 (7.6)
	Rural	35 (2.1)
Pediatric subspecialty	Yes **	476 (28.4)
	No	1198 (71.6)
Main area of the healthcare system where they work	Outpatient care in the sector of social security health insurance organizations and private health insurance companies	856 (50.8)
	Outpatient care in the public sector	466 (27.6)
	On call in the public sector	131 (7.8)
	Hospitalization in the public sector	131 (7.8)
	On call in the sector of workers' unions health insurance organizations and private health insurance companies	58 (3.4)
	Hospitalization in the sector of workers' unions health insurance organizations and private health insurance companies	31 (1.8)
	Other	13 (0.8)

\*Multiple answers.

\*\*361 (77%) provided both types of health care; 65 (13.9%) provided only specialty care and 43 (9.2%) worked only as clinical pediatricians.

SD: standard deviation.

N: number; (%): percentage.

(OR = 1.3,  $p = 0.04$ ). No differences were observed between the years of professional experience and the work areas or subsectors. Also, no significant differences were noted between the subsector ( $p = 0.7$ ) and the type of care ( $p = 0.13$ ) and having an expert available for consultation on vaccines.

Figure 1 describes the perceived level of training among surveyed pediatricians regarding different aspects of vaccination.

Having 10 or more years of professional experience or having received a recent update were independent predictors ( $p \leq 0.01$ ) of the perception of being more trained in all the aspects

**TABLE 2. Sources of information and updates on vaccination**

Question	Items	N = 1696 (%)
What sources do you use to keep yourself updated on vaccines? *	Recommendation guidelines or consensuses (international organizations, scientific societies, hospital protocols, ministerial recommendations)	1346 (79.4)
	Other updates (PRONAP, UpToDate, Medscape, etc.).	1030 (60.7)
	Class on vaccination	964 (56.8)
	Scientific conferences or meetings	819 (48.3)
	Recommendations from colleagues and specialists	342 (20.2)
	Original articles (publications in scientific journals)	269 (15.8)
	Recommendations from pharmaceutical sales representatives	128 (7.5)
	Other	18 (1.1)
	None	2 (0.1)
When did you receive the most recent update on the official national vaccination schedule (excluding training on COVID-19 vaccines)?	In the past year	806 (48)
	Between 1 and 2 years ago	412 (24.51)
	Between 2 and 5 years ago	298 (17.7)
	More than 5 years	104 (6.2)
	I have never received any update on this topic	23 (1.4)
	I do not remember	38 (2.3)
Do you regularly receive updated information about specific vaccination campaigns?	Yes	1533 (91.7)
	No	138 (8.3)
How do you receive updated information? *	E-mails from the Sociedad Argentina de Pediatría	1353 (79.8)
	E-mails from the Ministry of Health or the Department of Epidemiology in your district	828 (48.8)
	WhatsApp messages from colleagues/co-workers	478 (28.2)
	Videoconferences/webinars	369 (21.8)
	E-mails from vaccination units in your place of work/private vaccination centers	366 (21.6)
	Social media	338 (19.9)
	E-mails from other scientific societies	313 (18.5)
	Other	17 (1)
Do you think that you obtain updated and timely information regarding vaccination coverage in the region where you practice?	Yes	1259 (74.8)
	No	424 (25.2)
How do you obtain updated information on vaccination coverage?	Reports by the Sociedad Argentina de Pediatría	1075 (63.4)
	Reports by the Ministry of Health or the Department of Epidemiology in your district	851 (50.2)
	Your place of work	396 (23.4)
	Reports by other scientific societies	246 (14.5)
	International organizations (WHO, PAHO, UNICEF, etc.)	204 (12)
	Other	21 (1.2)

\*Multiple answers allowed.

WHO: World Health Organization.

PAHO: Pan American Health Organization.

related to vaccination. *Table 3* describes the associations.

Among the surveyed population, 54.0% (n = 911) mentioned asking about other family members' vaccination schedules. However, 37.5% (n = 632) asked this occasionally and 8.5% (n = 143) did not ask. They mainly asked about siblings (n = 837, 49.4%), pregnant women (n = 585, 34.5%), caregivers (n = 580, 34.2%), immunocompromised household members (n = 571, 33.7%), and older adults (n = 386, 22.8%).

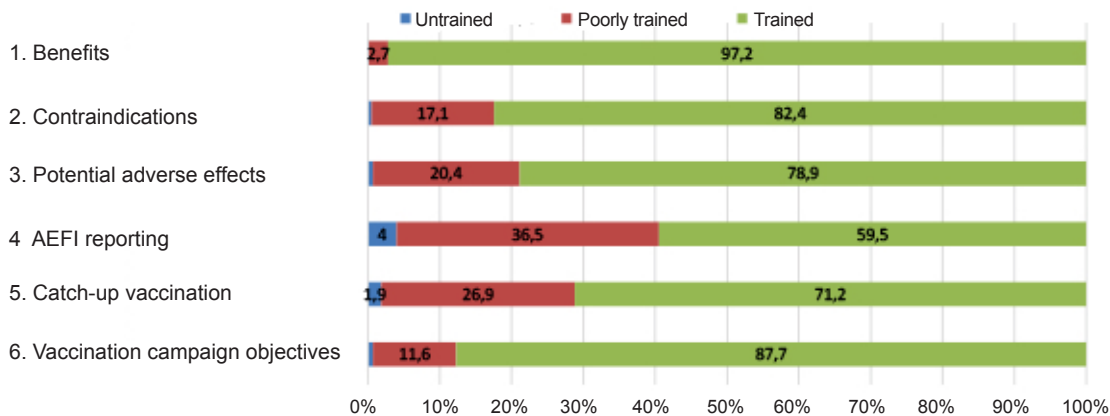
The office visit time to ask about patients' vaccination status was considered insufficient by 43.8% of respondents (n = 735). In relation to compliance with a vaccine indication from a previous visit, 82.2% of respondents (n = 1382) stated that they always checked compliance; 17.3% (n = 291) said that they checked only depending on the reason for consultation; and 0.5% (n = 8) did not check that the indicated vaccine had been given.

A higher proportion of pediatricians with 10 years or more of professional experience mentioned that they asked about family members' vaccination schedules (OR = 2.8,  $p < 0.01$ ), that they always checked vaccine indications in follow-up visits (OR = 1.4,  $p = 0.01$ ), and that they believed that the office visit time was enough to ask about vaccines (OR = 2.2,  $p < 0.01$ ).

In addition, 88.7% of surveyed pediatricians (n = 1504) mentioned difficulties when reading vaccination cards. The main difficulties were the multiple records/cards/documents per patient to verify doses given, damaged or illegible cards, differences in vaccine card formats, and difficulties in recognizing the vaccine due to recording format (*Table 4*).

The following were the main barriers identified in access to vaccination: false contraindications (62.3%), temporary vaccine shortage (46.4%), cultural reasons (41.4%), and restricted vaccination center hours (40.6%) (*Figure 2*).

**FIGURE 1. Perception of pediatricians' training to address vaccination-related aspects**



**TABLE 3. Association\* between years of experience and updates with the perception of being trained**

Trained in	Years of experience		OR (95% CI)	Updated in the past 2 years N (%)		OR (95% CI)
	N (%) ≥ 10 years	N (%) < 10 years		Yes	No	
Benefits	1291 (97.7)	341 (95.3)	2.1 (1.1–4.1)	1215 (98.27)	437 (94.4)	3.4 (1.8–6.4)
Contraindications	1134 (86.4)	241 (67.5)	3.1 (2.3–4)	1057 (87.4)	317 (69.1)	3.1 (2.4–4.0)
Adverse effects	1089 (83.2)	225 (63)	2.9 (2.2–3.8)	1002 (83.1)	311 (67.8)	2.3 (1.8–3.0)
AEFI reporting	859 (65.2)	137 (38.5)	3 (2.3–3.8)	784 (64.7)	209 (45.4)	2.2 (1.8–2.8)
Catch-up vaccination	1028 (78.1)	163 (45.7)	4.2 (3.3–5.5)	935 (77.1)	255 (55.4)	2.7 (2.1–3.4)
Campaign objectives	1191 (90.8)	273 (76.5)	3 (2.2–4.2)	1106 (91.5)	357 (77.8)	3.1 (2.2–4.2)

\*No confounding effect was observed in the multiple logistic regression model.

N: number.

AEFI: adverse events following immunization.

## DISCUSSION

This study allowed us to assess different aspects related to the knowledge, attitudes, and daily practices of pediatricians regarding vaccination.

Most of the respondents were women, were 50 years old, and had more than 10 years of professional experience. Their main working areas were the outpatient sector, with slightly

more than 50% working in the private subsector. Such professional profile is consistent with previous studies carried out in the same target population, and so is respondents' regional distribution; most participants worked in the SAP's metropolitan region.<sup>6</sup>

The region's vaccination programs, the development of new vaccines, and the possibility of introducing them into the vaccination schedule

**TABLE 4. Difficulties in vaccination card legibility**

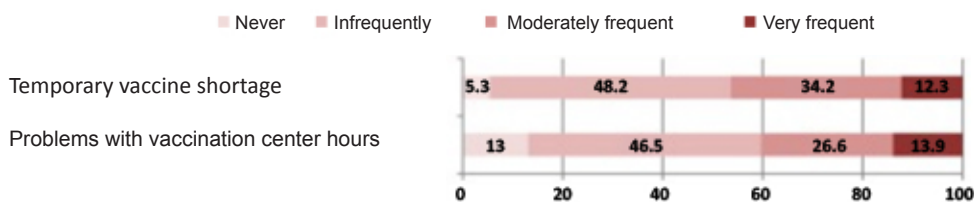
What difficulties do you have when reading vaccination cards during the office visit?* (N = 1696)	Multiple records/cards/documents per patient to check vaccine doses given to the patient	1034 (61%)
	Damaged or illegible cards	1013 (59.7 %)
	Differences in vaccination card formats	815 (48.1 %)
	Difficulties to recognize vaccine due to recording differences (brand, generic name, pharmaceutical company, etc.)	754 (44.5 %)
	No difficulties	192 (11.3 %)
	Other**	30 (1.8%)*

*Multiple answers allowed.*

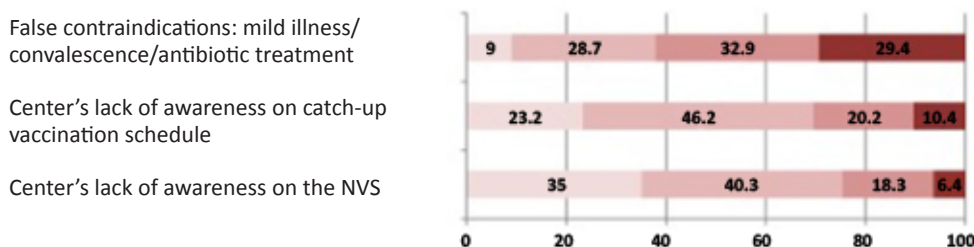
*\*\* They forget to bring the card to the office (n = 12), foreign cards (n = 3), lost cards (n = 3), no empty fields left (n = 3), other (n = 9).*

**FIGURE 2. Barriers perceived in access to vaccination**

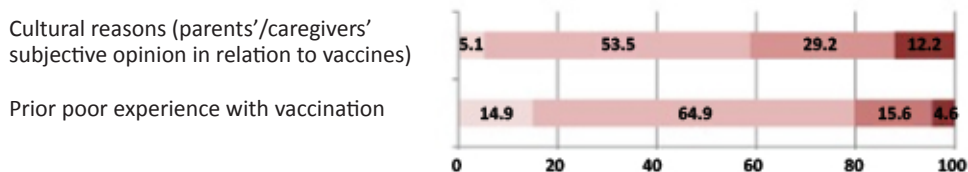
### A. Related to the vaccination center



### B. Related to vaccination center training



### C. Related to families



NVS: National Vaccination Schedule.

are dynamic and represent a challenge for healthcare providers.<sup>7</sup> In this context, it was observed that most surveyed pediatricians reported having a professional expert for consultations, and most of them were colleagues. Regarding the source of information on vaccines, the main sources of consultation and information on vaccination campaigns were recommendation guidelines or consensuses and e-mails from the SAP, respectively. This highlights the importance of the role of scientific societies in the development and dissemination of the different scientific documents, and specifically in Argentina, the role of the SAP in the training and continuing education of pediatricians.<sup>8,9</sup> In addition, most respondents had received formal training in vaccination in the past 2 years, which implies the need for continuing education as a fundamental tool.

Regarding the availability of vaccination coverage data at a local level, most respondents reported not having such information in a timely manner. This could be a barrier to the implementation of strategies at the local level.

It is worth noting that vaccines in Latin America have high levels of acceptance and trust by the population, compared to other regions of the world. However, the general population expresses more doubts about the safety of vaccines than about their effectiveness.<sup>10</sup> In our study, when assessing perception of being trained to address vaccination issues regarding safety, pediatricians reported feeling "poorly trained" in a considerable percentage of several of the aspects surveyed. This condition may imply an inadequate approach to these aspects in pediatric office visits, considering that healthcare providers play a key role in developing confidence in vaccines among families.<sup>11,12</sup>

In addition, almost 30% of the respondents reported being "poorly trained" in relation to catch-up vaccination, which once again highlights the importance of training in this scenario of low vaccination coverage.<sup>13</sup>

It is worth noting that there was a significant association between a greater perception of being trained regarding all the items surveyed and the years of professional experience as well as having recently received an update on vaccines. As for pediatricians with more years of professional practice, it is likely that, in addition to experience, other factors may be influencing this result, such as the perceived risk of vaccine-preventable diseases that were frequent or serious

decades ago (outbreaks of meningitis, measles, and invasive diseases caused by encapsulated bacteria).<sup>14-16</sup> It was also observed that, in daily practice, this same group acted differently than younger pediatricians, with more actions regarding family members' vaccination and vaccination card control. This finding highlights the importance of providing vaccine training using new tools adapted to this young group of healthcare providers. Pediatricians should regain an holistic approach, considering patients and their families; this is critical to achieve the objective of obtaining high vaccination coverage in our population.

This study also highlights the difficulty perceived by pediatricians when reading vaccination cards. In this sense, the implementation of the electronic vaccination registry for all individuals is critical to ensure the quality, timeliness, and availability of data for pediatricians, patients, and their families.<sup>17,18</sup>

In addition, frequent barriers to vaccination were identified linked to the vaccination center, healthcare staff, and families; this demonstrates, as in other studies,<sup>19</sup> that multiple causes are associated with low vaccination coverage and that they should be addressed comprehensively.

This study has certain limitations. First of all, it was carried out only with SAP members, who may not be representative of all Argentine pediatricians and other healthcare providers involved in the vaccination of children and adolescents, such as family physicians and nurses. Second of all, the response rate in this study was close to 11%, which may affect the representativeness of the sample and result in a selection bias. However, the response rate is consistent with that expected for this type of survey, with a passive recruitment modality and no rewards.<sup>20-22</sup>

Trust in the healthcare system was reported as a determinant of vaccine acceptance and lack of medical indication was a risk factor for hesitancy.<sup>19</sup> In this regard, pediatricians may be the driving force in changing people's attitudes and perceptions regarding vaccination.

## CONCLUSIONS

Most of the survey respondents had received recent training and their main source of information was specific guidelines and consensuses. Approximately 25% of them do not receive updated information about vaccines and do not have an expert available for consultation.

The perception of the level of training varied

depending on the vaccination-related aspect. Overall, they felt less trained in terms of safety and catch-up vaccination. Most respondents had difficulties when reading vaccination cards and reported multiple frequent barriers associated with access to vaccination.

Pediatricians with more years of professional experience and those who received recent updates about vaccines described themselves as being more trained in all aspects. ■

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Supplementary material available at: [https://www.sap.org.ar/docs/publicaciones/archivosarg/2024/10204\\_AO\\_Gentile\\_Anexo.pdf](https://www.sap.org.ar/docs/publicaciones/archivosarg/2024/10204_AO_Gentile_Anexo.pdf)

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