

## Barriers and facilitators to influenza vaccination observed by officers of national immunization programs in South America countries with contrasting coverage rates

Barreras y facilitadores de la vacuna contra la gripe observados por funcionarios de los programas nacionales de inmunización en países de Suramérica con niveles de cobertura contrastantes

Barreiras e facilitadores da vacinação contra influenza observados por funcionários dos programas nacionais de imunização em países Sul-Americanos com diferentes níveis de cobertura

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doi: 10.1590/0102-311X00045721

### Abstract

*Influenza is a severe, vaccine-preventable disease. Vaccination programs across Latin American countries show contrasting coverage rates, from 29% in Paraguay to 89% in Brazil. This study explores how national influenza vaccination programs in the chosen South American countries address vaccine confidence and convenience, as well as complacency toward the disease. Barriers and facilitators to influenza vaccination programs in their relation to vaccine hesitancy were observed by documentary analysis and interviews with 38 national immunization program officers in high- (Brazil and Chile) and low-performing (Paraguay, Peru, and Uruguay) countries. Influenza vaccination policies, financing, purchasing, coordination, and accessibility are considered good or acceptable. National communication strategies focus on vaccine availability during campaigns. In Chile, Paraguay, and Uruguay, anti-vaccine propaganda was mentioned as a problem. Programming and implementation face human resource shortages across most countries. Statistical information, health information systems, and nominal risk-group records are available, with limitations in Peru and Paraguay. Health promotion, supervision, monitoring, and evaluation are perceived as opportunities to address confidence and complacency. Influenza vaccination programs identify and act on most barriers and facilitators affecting influenza vaccine hesitancy via supply-side strategies which mostly address vaccine convenience. Confidence and complacency are insufficiently addressed, except for Uruguay. Programs have the opportunity to develop integral supply and demand-side approaches.*

Human Influenza; Vaccine-Preventable Diseases; Immunization Programs; Vaccination

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## Introduction

Influenza is a viral respiratory disease that places a heavy burden on health systems, particularly in low- and middle-income countries <sup>1,2</sup>. Vaccination is one of the most effective interventions to prevent diseases <sup>3</sup>. Vaccines show an efficacy above 60% and a mortality reduction of up to 80% <sup>4</sup>. Yet, influenza still exerts a heavy toll on health, with three to five million severe cases of the disease and between 290,000 to 650,000 influenza-related deaths, mainly affecting the risk groups that have been prioritized for vaccination: pregnant women, infants, older adults, and adults with risk factors <sup>3</sup>.

Latin American countries have made significant advances in introducing and scaling up seasonal influenza vaccines, giving increasing priority to immunization strategies as an integral part of the national immunization programs (NIP). Most South American countries have a seasonal influenza policy of freely providing vaccination to children aged under six years, people with chronic comorbidities, adults aged over 60 years, pregnant women within 20 weeks of gestation or puerperal women <sup>5</sup>. However, coverage levels achieved vary from one country to another, ranging across older adults, pregnant women, and children aged under five years from 29% in Paraguay to 89% in Brazil. Among the countries in the Andean Region (Peru, Bolivia, Ecuador, Colombia, and Venezuela) and the South Cone (Argentina, Chile, Paraguay, and Uruguay), and Brazil, NIP covered, in 2018 (or the most recent year), 61.6% of adults aged 60 years and older, 58.4% of children aged under six years, 56.7% of pregnant women, and 76.7% of adults with chronic conditions <sup>6</sup>. Vaccination coverage across all risk groups in Argentina, Bolivia, Brazil, Chile, Colombia, and Ecuador perform above the regional average, whereas Paraguay, Peru, Uruguay, and Venezuela perform below the average <sup>6</sup>.

Supply- and demand-side factors influence influenza vaccine coverage <sup>7</sup>. On the demand side, vaccine hesitancy has been defined as the delay in accepting or rejecting vaccines despite their availability <sup>8,9</sup>. Vaccine hesitancy is the result of a complex interaction of behavioral and societal factors whose intervention requires leadership from vaccination programs. Among several models that have been proposed to analyze vaccine hesitance, the “3Cs” model considers the role played by confidence, complacency, and convenience <sup>10</sup>. Confidence is the degree of trust in the effectiveness and safety of the vaccine, in its delivery system – including the reliability and competence of health services and professionals –, and in the motivations of the decision-makers to achieve effective access to vaccines <sup>9</sup>. Lack of confidence stems from strong negative attitudes towards vaccination, which can be influenced by misinformation about vaccination risks, affiliation to anti-vaccine groups or by legitimate concerns regarding vaccine safety and efficacy. Complacency refers to the degree to which people consider vaccination necessary to prevent a vaccine-preventable disease, as a result of the combination of risk perception, knowledge of the disease and the vaccine, prejudices regarding side effects and other reactions, and the need for vaccination. Vaccine convenience is defined by availability, affordability, willingness to pay, geographical accessibility, ability to understand and to accept vaccine-related information, the appeal of immunization services, and quality of care <sup>10,11</sup>.

NIP can address vaccine hesitancy by increasing confidence on their effectiveness and safety; reduce complacency by clearly and convincingly communicating influenza risks and immunization benefits, and improve the perception of convenience derived from vaccine availability and accessibility. It can be hypothesized that the factor most directly addressed by NIP is convenience via their focus on vaccine supply, relegating strategies to bolster vaccine confidence and to tackle influenza complacency.

This study aims to explore, based on the perspective of officials interviewed in each country, the balance between facilitators and barriers to address vaccine confidence, complacency, and convenience in the chosen South American countries (Brazil, Chile, Paraguay, Peru, and Uruguay) which show contrasting influenza vaccination coverage.

## Methods

A qualitative study was conducted based on national immunization program documentation and semi-structured interviews with program officials at the strategic planning and operational levels. Five South American countries were selected based on judgement of their vaccination rates. Our choice aimed to include countries with contrasting vaccination coverages. Brazil and Chile were selected as high performers and Paraguay, Peru, and Uruguay as low performers<sup>6</sup>. Informant selection was based on convenience. Officials were identified based on their profiles of responsibility and participation in decision-making for the national (strategic level) management of NIPs, as well as those who participate in the programming and operational implementation processes, particularly with relation to influenza, in the states, regions or municipalities (operational level).

Informants were contacted by phone call or email and informed of the objectives of our investigation. Then, we requested appointments for face-to-face interviews. In total, 57 officials were contacted (27 at the strategic level and 30 at the operational level). Out of these, 38 agreed to be interviewed, 17 being at the strategic level and 21 at the operational level (Box 1). All interviews were conducted in Spanish (or Portuguese in the case of Brazil). A total of 61 documents were analyzed for the five countries, covering the guidelines of the national vaccination programs and their legal support, as well as national health plans, technical operational guidelines, manuals, bulletins from the epidemiology and statistics departments, and Pan American Health Organization (PAHO) country reports and evaluations.

Interview and documentary content analyses were carried out by researchers specializing in Public Health or Social Sciences and Health in each of the studied countries. Interview guides for each country were designed specifically for this investigation (Supplementary Material I: [http://cadernos.ensp.fiocruz.br/static//arquivo/supl-e00045721-i\\_8686.pdf](http://cadernos.ensp.fiocruz.br/static//arquivo/supl-e00045721-i_8686.pdf); Supplementary Material II: [http://cadernos.ensp.fiocruz.br/static//arquivo/supl-e00045721-ii\\_3005.pdf](http://cadernos.ensp.fiocruz.br/static//arquivo/supl-e00045721-ii_3005.pdf)). Interview and content analysis guides aimed to explore influenza program barriers and facilitators such as policy formulation, program planning, implementation, monitoring, and evaluation.

Each interview was carried out in the interviewee's own work environment at a previously agreed time, lasting for 55 minutes on average. In all cases, before the interviews, permission was requested to record them and confidentiality consents were provided. Interview transcriptions and document content were coded in ATLAS.ti version 7 (<http://atlasti.com/>) via the directed content analysis technique<sup>12</sup>, based on predetermined codes, themes, and sub-themes that were developed from the literature, documents on the planning and operational implementation of health programs, and the 3Cs model. Also, during the coding process, pop-up codes were identified and linked to related themes and sub-themes via an iterative deductive/inductive approach. This process allowed us to identify program facilitators and barriers in relation to the 3Cs model of vaccine confidence, convenience, and influenza risk complacency at each country.

Our research protocol was approved in each country by their National Ethics Researches Committee as follows: Brazil (National Ethics Reserach Commision, 05215918.6.0000.5347); Chile (Ethics Research Committee on Beings, Faculty of Medicine, University of Chile, 191-2018); Paraguay (Ethics Research Committee, Central Public Health Laboratory, 106/2019); Peru (Prisma Ethics Research Committee, CE1651.18); and Uruguay (Ethics Research Committee, Uruguayan National Institute of Public Health, 1580).

**Box 1**

Number and position of vaccination program officers interviewed, by country and level of responsibility.

COUNTRY/LEVEL	n	POST
Brazil		
Strategic	2	National coordinator of the National Program for Immunization of the Ministry of Health State coordinator of the Rio Grande do Sul Immunization Program
Operational	7	Coordination Advisor at the Ministry of Health Management Advisor – São Paulo State Health Secretariat Responsible for cold chains in the state – Rio Grande do Sul State Health Secretariat Management Advisor – São Paulo Municipal Health Secretariat Municipal coordinator of the immunization program – Porto Alegre (Rio Grande do Sul State) Municipal Health Secretariat Management advisor – Porto Alegre (Rio Grande do Sul State) Municipal Health Secretariat Technician – Porto Alegre (Rio Grande do Sul State) Municipal Health Secretariat
Chile		
Strategic	4	Head of the Immunization Department of the Ministry of Health Head of the Epidemiology Department of the Ministry of Health Assistant Secretary of Health Administrative Coordinator of the Division of Disease Prevention and Control of the Undersecretary of Public Health of the Ministry of Health
Operational	4	Technical advisor to the National Immunization Program in the Municipality of San Joaquin Nurse in charge of the support services of the Family Health Center (CESFAM) located in the commune of San Joaquin In charge of health programs in the Puente Alto district Nurse Coordinator of support services of the Family Health Center (CESFAM) located in the Rancagua commune
Paraguay		
Strategic	5	Director of the Directorate of Surveillance of Communicable Diseases (DIVET) General Director of Health Surveillance (DGVS) Director of the Ciudad del Este Regional Hospital Director of the X Sanitary Region Head of the MYP Supervision Department
Operational	2	Regional Chief of the National Immunization Program of the X Region of Alto Paraná. She currently works as a Technical Advisor at DIVET Served as Head of the EPI for Health Region VIII – Asunción
Peru		
Strategic	2	Technical Director of the Specialized Warehouse of the Integrated Supply System for Medicines and Medical-Surgical Supplies (SISMED) Planning Specialist at the Ministry of Health
Operational	5	Coordinator of Immunizations in Regional Health Management Coordinator of Immunizations in Health Network Coordinator of the Immunization Strategy at the hospital level Coordinator of Immunizations in Integrated Health Networks Management Health Network Immunization Coordinator
Uruguay		
Strategic	4	Internal Medicine Specialist in Infectiology Associate Professor of Pediatrics, Faculty of Medicine, Hospital Pereyra Rossell Director of the National Vaccination Program of the Ministry of Public Health Director of Health - Ministry of Public Health
Operational	3	Head of the Calmette Laboratory of the Honorary Commission for the Fight against Tuberculosis Reference and in charge of vaccinations Full professor (Grade 5) of the Chair of Pediatrics. Chairs the CHLA-E
Total		
Strategic	17	
Operational	21	

## Results

The national influenza vaccination programs of the five studied countries are similar regarding their coverage policies, targeted risk groups, and vaccination schedules (Table 1). Programs aim to cover, free of charge, all children aged under five years, pregnant women, adults older than 60 years, and persons living with chronic illnesses. Main program differences lie in age group definitions, inclusion of other risk groups, such as indigenous peoples and institutionalized persons (except in Uruguay), and in the reported coverage of each risk group. Immunization coverage of people with chronic diseases is problematic as information is out of date or missing, whereas coverage rates, when reported, ranges from 99% to 97%. For other risk groups, high-coverage countries as Brazil and Chile report 81% to 95% and 65% to 90% coverage across risk groups, respectively. For low-coverage countries, figures range from 24% to 54% for Paraguay, 38% to 55% for Peru, and 24% to 57% for Uruguay. Health personnel is always the group best covered across countries, except for Brazil, in which older adults occupy that position.

Below, we show barriers and facilitators to vaccination coverage, contrasting program officers' perceptions on supply- and demand-side components. Supply-side components include legal and financial bases; programming, purchase and distribution; personnel; access; collaboration arrangements; and monitoring, research, and evaluation. Demand-side components focus on vaccine promotion and communication; confidence on the vaccine; and complacency with influenza. Results for confidence and complacency are followed by testimonies for further detail.

**Table 1**

Influenza vaccination coverage by risk groups in selected South American countries, 2018 or most recent year.

Risk group	Brazil % coverage	Chile % coverage	Paraguay % coverage	Peru % coverage	Uruguay % coverage
Children	88 *	71 **	24 ***	55 #	24 **
Older adults	97 ##	65 ###	34 ###	ND ##	32 ###
Persons with chronic diseases	ND §	100 §,§§	100 §,§§	99 §,§§	ND §,§§
Pregnant women	81 §	90 §	28 §	38 §	25 §
Health personnel	95 §	100 §	54 §	ND §	57 §
Others	ND §§§	ND †	ND ††	ND †††	ND ‡

ND: no data.

Source: Pan American Health Organization <sup>6</sup>.

\* From 6 months to 6 years;

\*\* From 6 months to 5 years;

\*\*\* From 6 months to 3 years;

# > 2 years;

## > 60 years;

### > 65 years;

§ Yes;

§§ 2017 for Chile, 2016 for Peru, and 2013 for Paraguay;

§§§ Teachers, indigenous peoples, prisoners;

† Chicken and pig farmers;

†† Teachers, caregivers to institutionalized persons, journalists, prisoners;

††† Security and military personnel, prisoners, and institutionalized persons, indigenous peoples, residents of cold areas;

‡ None.

## **Supply-side components**

### **• Legal and financial bases**

Influenza vaccines are part of NIPs under the responsibility of national governments' Ministries of Health <sup>13,14,15,16,17</sup>. According to program officers, NIPs are politically, legally, and financially well supported, which guarantees their sustainability. In all countries, documentation supports the legal and financial bases of program norms and guidelines, except in Paraguay, in which the National Vaccine Law lacks written regulations. Officers in the country are proposing a regulation to introduce administrative sanctions to officers failing to reach vaccination goals. Regulations for the Uruguayan program have been recently reformulated to strengthen its implementation.

The Peruvian program is perceived as facing financing problems stemming from the failure to identify at-risk groups and, hence, to request the budget required to serve them. In Paraguay, financial resource limitations are perceived specifically in the lack of local financial resources to fund vaccination campaigns. On the other hand, Chile recently increased its budget toward these campaigns and introduced incentives to health personnel performance to reduce lost vaccination opportunities and increase coverage.

### **• Programming, purchase, and distribution**

NIP planning across countries is conducted by the Ministries of Health via immunization departments or directorates charged with defining national objectives and goals. Determining targets for influenza vaccination coverage faces limitations in all countries, according to NIP officers' perceptions. All countries have nominal registers available for children, pregnant women, and older adults, although program officers perceive the need to expand and strengthen them via improved coordination with authorities responsible for providing local information. Generally, NIPs report the lack of registers of persons living with chronic diseases and find the information on local disease prevalence unreliable. As noted in Box 2, there is a lack of recent information regarding the coverage of the influenza vaccine for this risk group. In Brazil, interviewees perceive the administrative autonomy of municipal governments as a problem due to the voluntary adhesion of municipalities in the use of the national health information system – with only 50% of the municipalities using it. In spite of the availability of registers in Uruguay (except for chronic diseases), its NIP estimates the total population to be vaccinated, whereas risk groups are quantified and targeted only via local operational strategies. In Paraguay, reliance on nominal registers is also limited, and programming is based on census information, itself out of date since the last census is from 2002. Generally, NIPs report purchasing arrangements of influenza vaccine as satisfactory, based on the consolidated purchasing of PAHO via its revolving fund mechanism, except for Chile, which successfully relies on direct competitive bidding. Distribution is carried out according to established deadlines, although a threat of delays was perceived due to cumbersome bureaucratic purchasing processes (Peru), barriers with vaccine importation (Uruguay), deficiencies with distribution coordination (Paraguay), and the need to cover a vast geographic area (Brazil).

### **• Personnel**

Peru, Chile, and Brazil have specific guidelines for training health personnel for their vaccination programs. Officials from all countries claimed that Ministries of Health formulated training guidelines which were implemented top-down all the way to health facilities, but in Paraguay and Uruguay, respondents reported unpublished training guidelines. Except for Uruguay and Paraguay, interviewees reported specific problems with personnel availability or with the competencies needed for executing the influenza vaccination program. Difficulties were reported in hiring or retaining operational and health personnel (Brazil); personnel shortages and the lack of skills specific to vaccinating migrant populations (Chile), and problems with campaigns in remote areas (Peru). Regarding the latter, remedial innovative training strategies were reported to be under implementation.

- **Access to services**

Respondents in all studied countries reported that the population face barriers to accessing vaccination health services, except in Uruguay. Participants reported that service centers for the Brazilian, Paraguayan, and Peruvian programs are often remote, and, also for Brazil and Uruguay, they highlight inflexible opening hours during vaccination campaigns. Respondents indicated economic and educational barriers in Paraguay, whereas, for Peru, they found cultural barriers affecting indigenous populations. The only strategy mentioned to improve access was expanding infrastructure in remote areas of Paraguay and Peru.

- **Collaboration arrangements**

Coordination across public health institutions is reported as successful in all programs, as well as with the private sector. For the latter, written coordination mechanisms or signed agreements are reported for all countries. In Brazil, program officers found difficulties in coordinating with the education sector for child vaccination. In Uruguay, agreements enable government influenza vaccine distribution and free delivery by both public and private health providers. Brazil, Paraguay, and Uruguay have reinforced vaccination programs via collaboration agreements with civil society organizations. Brazilian program officers perceived that collaboration had diminished after program goals were increased.

- **Monitoring, research, and evaluation**

Brazil, Chile, and Peru have published guidelines for evaluating influenza vaccination campaigns. In Brazil and Chile, state or provincial coordinators conduct permanent monitoring to update registers, compile goals by priority groups, and permanently evaluate local program performance. In Chile, vaccination campaign supervision is carried out during planning, and organization, execution, and coverage evaluation stages. Peruvian guidelines stipulate that the program must convene national, macro-regional, and regional program authorities to monitoring meetings, whereas health establishments are to locally monitor a set of indicators. In Peru and Paraguay, monitoring is restricted to the number of doses applied according to risk groups. Officers in Uruguay reported monitoring vaccination organization and vaccination center performance.

The evaluation of influenza vaccination programs is the responsibility of the Ministry of Health, with PAHO reporting on program coverage internationally<sup>18,19,20,21,22</sup>. Chile reported external impact evaluations, such as the one carried out by the Ministry of Finance, whereas in Brazil, the NIP carries out impact evaluations. Only Uruguayan NIP officers mentioned research on vaccination hesitancy. The absence of studies assessing vaccine confidence were mentioned as a barrier in Peru, particularly among indigenous groups living in urban areas or those still uncontacted.

### **Demand-side components**

- **Vaccine promotion and communication**

The situation of influenza vaccine confidence and convenience by risk groups is not specifically addressed in published program documentation across countries, although all programs, except the Paraguayan one, publish communication and promotional guidelines. The Chilean program is the only one among the five countries to specify promotional guidelines targeting the risk groups that prove most difficult to cover in the previous campaign, with the most recent guideline focusing on children, older adults, and pregnant women. In Brazil and Uruguay, program officers also report focusing on the risk groups least covered in previous years.

Program officers across all countries report the implementation of communication strategies to promote the national influenza vaccination season based on television, radio, posters, and social networks. In Brazil, officers saw a problem in the exclusive use of traditional media, instead of using new social media, such as Facebook, WhatsApp, and Instagram to reach a larger population. In Chile,

informants indicated the need for adaptation to the new realities of social media, whereas in Paraguay, they found the need for more integrated promotional efforts across all vaccines. In Peru, informants perceived these strategies as partially effective, with good coordination across communication channels and increased coverage of the vaccine, but with the need to increase media coverage. In Uruguay, program officers reported the recent intensification of promotional efforts for the influenza vaccination campaign via mass media, as well as via videos screened in waiting rooms. However, officers pointed to the reduced effectiveness of promotional efforts due to the delays with vaccine supply mentioned above.

Uruguay was the only country which published a diagnosis of its national immunization program and of influenza vaccine confidence and complacency. A study conducted in 2016 found high levels of confidence by parents of immunized children as a whole<sup>23</sup>. However, a study in 2017 evidenced high complacency with influenza, with 24% to 26% of mothers of preschool children, pregnant women, and older adults considering this a serious or very serious disease. Among persons in the same risk groups who were not vaccinated, 18% to 21% stated either lacking trust in the vaccine or fearing adverse effects<sup>24</sup>.

- **Vaccine confidence**

In Uruguay, distrust in the vaccine is manifested in the exaggeration of its adverse effects, unlike other vaccines with greater acceptance:

*“Nobody questions vaccines or their adverse effects or anything, but in the case of the flu...”* (Interviewee at strategic level – Uruguay).

*“People get vaccinated, catch a cold, and think first that it was because of the vaccine (...) and since they got a cold, they say ‘the vaccine is useless’, then word of mouth begins to circulate”* (Interviewee at strategic level – Uruguay).

Program officers in Chile, Paraguay, and Uruguay mention the population’s belief in myths about the vaccine, including that it will lead to the development of a more severe form of the disease:

*“People generally believe in the myth that if they get vaccinated, they will get a more severe flu, more severe symptoms (...) A cold that would occasionally be a normal cold, they associate [it] with vaccination (...) that would lead to a more serious form [of the disease]”* (Interviewee at strategic level – Paraguay).

In the Chilean, Paraguayan, and Uruguayan programs, anti-vaccine discourse is perceived as a threat to confidence in the influenza vaccine, as it is believed to generate fear of vaccination and resistance toward it. For the Peruvian program, mistrust is a problem among native, ethnic, and uncontacted groups. Program officers in Chile explicitly said that anti-vaccine misinformation is disseminated via social networks such as Facebook, WhatsApp, YouTube, Twitter, and Instagram, whereas for other countries, no specific sources of misinformation were mentioned, although the existence of anti-vaccine groups was mentioned in Uruguay.

A critical barrier mentioned by all programs, except the Brazilian one, is health personnel’s lack of confidence in the influenza vaccine:

*“The same health personnel do not want to be vaccinated. The flu vaccine does not have much credibility regarding its effectiveness or its conviction. Health personnel are not convinced”* (Interviewee at strategic level – Paraguay).

- **Complacency with influenza**

Program officers in the five countries perceive complacency with influenza risks as a problem, finding that strategies to reduce it are insufficient. In Chile, complacency is perceived particularly among migrant populations. In Uruguay, complacency among health personnel is highlighted both in their reluctance to promote the vaccine across risk groups and to apply it to themselves:

*“In medical groups, it is discussed whether to vaccinate or not, so (...) if that is installed, it is very difficult to reverse, that is, I know that risk groups are not reached as they would like to”* (Interviewee at operational level – Uruguay).

In Chile, mass media spotlights regarding the flu are perceived as more influential than programs to reduce complacency:



*“We campaign every year, but what influences the most is when people feel at risk. Last year, there was a lot of demand after what had happened in the Northern hemisphere”* (Interviewee at strategic level – Chile).

In Brazil, barriers to reduce complacency are perceived specifically among pregnant women, a situation believed to be reinforced by the reluctance of health personnel to indicate the vaccine during the gestation period:

*“There is this well-known fear regarding the vaccination of pregnant women (...) I think there are still many physicians who do not recommend vaccines and many pregnant women who, depending on the recommendation, are afraid and will not go”* (Interviewee at operational level – Brazil).

Furthermore, program officers in Brazil perceive complacency with influenza risks as a paradoxical consequence of the success of the program, with reduced influenza morbidity and mortality minimizing exposure to the risk of becoming ill.

## Discussion

To the best of our knowledge, this is the first study conducted across South American countries to assess how NIPs balance problem formulation and strategy implementation to address influenza vaccination hesitancy by high-priority risk groups. Our results suggest that NIPs are mostly concerned with addressing influenza vaccine convenience by identifying specific barriers (Box 2) and supporting the program on facilitators (Box 3) bearing on vaccine supply. In contrast, the identification of barriers and facilitators related to influenza vaccine confidence and to complacency with influenza are underdeveloped. Countries that report high vaccination coverage rates (Brazil and Chile) tend also to report fewer barriers and more facilitators across program components than low vaccination coverage countries (Paraguay, Peru, and Uruguay). However, program officers across all countries perceive difficulties in addressing vaccine confidence and complacency with influenza.

The legal support that NIPs receive guarantees the allocation of financial resources for vaccination campaigns, with resource restrictions related more to programming issues than to financial shortages. This support is likely to influence the free availability of the vaccine for the at risk populations. All NIPs perceive vaccine purchase and distribution as mostly satisfactory, except for Uruguay, thus, with specific distribution challenges thus ensuring that the vaccine is available prior to the flu season. Though Brazilian, Paraguayan, and Peruvian NIPs found problems of geographic access affecting vaccine convenience, these are focused mostly on rural and indigenous populations.

Personnel shortages were mentioned mostly for the remote parts of the countries or with migrant populations. Participants mentioned the lack of competencies to address vaccine hesitancy only for indigenous and migrant populations. Thus, the question arises if local health personnel possess the required competencies to build confidence and decrease complacency. Only Paraguay and Peru mention educational and cultural barriers on the part of beneficiary populations – the latter, only for indigenous populations. However, respondents reported no specific strategies to tackle these problems. Collaboration with health service providers is perceived as satisfactory across NIPs, although they found opportunities to strengthen collaboration with civil society organizations. NIP monitoring is stronger in Brazil and Chile than in the other three studied countries, although this critical program component restricts itself to vaccine coverage surveillance and leaves out confidence and complacency indicators.

NIP officers perceive confidence and complacency as acute problems affecting coverage and consider the need to improve communication and information strategies. However, they observed no specific efforts to address them. Officers see influenza vaccine hesitancy as particularly influenced by culture and myths as compared to other vaccination programs. Furthermore, they found severe barriers and facilitators to address confidence and complacency, such as the reluctance of health personnel to recommend the vaccine to pregnant women and the influence of mass media.

**Box 2**

Barriers perceived by vaccination program officers at the strategic and operational levels regarding the components of influenza vaccination programs, according to the 3Cs model.

BARRIER	BRAZIL	CHILE	PARAGUAY	PERU	URUGUAY
Legal bases	Administrative autonomy of municipalities		Unregulated National vaccination law		
Financing		Scarce resources to search for populations at risk	Insufficient financial resources	Influenza vaccination program has to compete for resources	
Programming	Difficulty estimating population in small municipalities	Limitations in estimating the adult population with chronic conditions	Out-of-date population demographics hinder setting coverage goals for risk groups	Out-of-date population demographics	Limitations to estimating the adult population with chronic conditions
	Difficulty defining targets for chronic disease risk groups	Difficulty defining goals for the population with chronic conditions	Vaccination targets set with respect to supply in previous years	Out-of-date nominal list of persons to vaccinate	Coverage goals not established by risk groups
Purchase and distribution	Complex distribution given the size of the country			Delays in the purchase and distribution of biologicals	Delay in receiving biologicals affects campaign management and vaccine effectiveness
	Bureaucracy for acquiring and maintaining the cold chain				
Personnel	Shortages and rotation of health personnel	Staff shortages affect program execution	Limited regional management capacity		
	Difficulty ensuring the permanence of program management personnel	Health teams lack the skills to care for the migrant population	Insufficient health personnel		
Collaboration	Difficulty coordinating intersectorial actions				
Access	Geographical barriers to access health services and limited opening hours		Geographical and economic barriers to access to health services	Geographic access barriers	Absence of guidelines to extend service hours
Vaccine promotion and communication	Insufficient diversification of communication strategies	Limitation to promotion via social networks	Need to integrate across different vaccine programs	Need to increase coverage	Promotion out of sync with vaccine supply
Monitoring, research and evaluation	Health information system experiences constant changes and challenges in staff training		Monitoring focuses on applied doses	Difficulties in evaluating processes and monitoring the program	

(continues)

## Box 2 (continued)

BARRIER	BRAZIL	CHILE	PARAGUAY	PERU	URUGUAY
Confidence	Fake news about immunization	Health personnel are suspicious of the effectiveness of the vaccine	Staff distrustful of vaccine effectiveness	Lacks studies on vaccine acceptance in ethnic, native, and uncontacted groups	Population's low confidence in the vaccine
		Influence of anti-vaccine groups	Booming anti-vaccine discourse	Health personnel are suspicious of the effectiveness of the vaccine	Anti-vaccine discourse
		Vaccine myths	Myth that vaccine produces a more severe picture of influenza	Poor communication and dissemination	Vaccine myths
		Communication campaign with low visibility by the public	Poor communication and dissemination	Cultural barriers affect health services for indigenous populations	
Complacency	Low-sensitized health personnel to indicate a vaccine, especially in pregnant women	Migrant population not very sensitive to the need to be vaccinated	Poor communication and dissemination	Lacks studies on vaccine acceptance in ethnic, native, and uncontacted groups	Problems of awareness in population and health personnel
	Program success discourages demand for immunization	Communication campaigns with low visibility by the public	Educational barriers in a population that does not know or identify the required vaccines	Poor communication and dissemination	High complacency
	Hesitation in pregnant women			Cultural barriers affect health services for indigenous populations	Ineffective communication and dissemination strategies with no focus on risk groups

Note: empty cells mean that no barriers were observed for the program aspect in question.

Source: interviews to vaccination program officers.

Among the most prominent concern perceived is how incapable NIPs are to plan according to their needs, particularly in estimating target risk groups. Informants' perceptions coincide with the situation reported by Ropero et al.<sup>25</sup> for adults with chronic conditions in Latin American and Caribbean countries. The absence of specific denominators has been indicated as a barrier to implementing influenza vaccination programs that affect the scheduling of immunization activities and their monitoring<sup>7</sup>.

The need for training and motivating health personnel is critical to addressing confidence and complacency, individuals who often suffer from overload and receive few training opportunities<sup>26</sup>. Although training strategies were in place in all studied countries, informants perceived health personnel's low acceptance and sensitivity to recommend the vaccine. In Nigeria, a study has found that NIPs focus on the technical components of the program at the expense of the development of communication skills<sup>27</sup>, despite the importance of interactions between people and health professionals, particularly to provide trusted information about vaccines<sup>28</sup>.

Brazilian and Chilean officers' perceptions of vaccination strategies are, in general, more favorable than those from the other three countries. However, Uruguay is the country in which program

**Box 3**

Facilitators of the components of the vaccination programs perceived by the officials of vaccination programs of strategic and operational level against influenza, according to the 3Cs model.

FACILITATORS	BRAZIL	CHILE	PARAGUAY	PERU	URUGUAY
Legal bases	Linking the NIP to the Brazilian Unified National Health System, ensuring stability to the program			Influenza vaccination is a priority policy	Influenza vaccination is a priority policy
	Set of regulations that regulate vaccination facilities.				Regulations support the vaccine supply in public and private establishments
Financing	Monthly transfer of resources to the states	Allocated budget has increased in recent years			
	The allocation of federal resources prioritizes vaccination	Follow-up of health personnel and establishment of incentives to avoid missed vaccination opportunities			
Programming	Extension and strengthening of nominal registry		PAHO support in programming and purchasing vaccines	Efforts to update the nominal registry	Extension and strengthening of nominal registry
					Adequate planning and operational management
Purchase and distribution	Centralization of acquisition of immunobiologicals by the federation and distribution according to targets	Improvement in key areas, such as vaccine purchase, distribution, and management	Distribution of biologicals according to guidelines		
Personnel				Innovative training strategies for staff in remote areas	
Collaboration	The Ministry of Health coordinates private establishments to offer the vaccine	Coordinated work between the Ministry of Health and local health services	Coordinated and integrated work in health regions	Ministry of Health articulates private establishments via agreements	Coordinated work between institutions and providers
	Strengthen partnerships with civil society organizations to disseminate campaigns	Agreements with private providers to supply vaccine	Ministry of Health coordinates private establishments to offer the vaccine	Strengthening of the network of health service providers	
Access			Policy in place to increase primary care infrastructure		

(continues)

**Box 3 (continued)**

FACILITATORS	BRAZIL	CHILE	PARAGUAY	PERU	URUGUAY
Promotion and communication	Guidelines available	Guidelines available to target risk groups		Guidelines available	Guidelines available
	Targeting low-coverage groups			Good coordination across vaccine programs	Targeting low-coverage groups
	Mass media campaigns	Mass media campaigns	Mass media campaigns	Mass media campaigns	Intensification of mass media campaigns
Monitoring, research and evaluation	National information system allows the monitoring of vaccination in municipalities and states	Supervision processes implemented in the key phases of the program	PAHO support in systematizing the information obtained		Information system contributes to program planning, implementation, and evaluation
	New registration system allows nominal monitoring	Efficiently and effectively implemented influenza campaigns			Systematically implemented supervision, monitoring, and evaluation strategies
		Daily monitoring and follow-up of coverage			Information system improves data availability and quality of information
Confidence			Vaccine is demanded by the population		Intersectorial collaboration in communication and dissemination actions
Complacency	Strengthen partnerships with civil society organizations to disseminate the campaign				Intersectorial collaboration in communication and dissemination actions

NIP: national immunization programs; PAHO: Pan American Health Organization.

Note: empty cells mean that no facilitators were observed for the program aspect in question.

Source: interviews to vaccination program officers.

officers more sharply indicated complacency problems. Notably, this country also reports the lowest vaccination rate. In a health service exit survey of individuals across risk groups, conducted by the authors in the same countries, Uruguay showed the highest complacency, particularly regarding the perception of influenza as a serious risk as well as the knowledge of influenza and the vaccine. Uruguay was also the country with the lowest confidence in the vaccine. A logistic regression suggested that confidence most strongly predicts vaccination rates, thus placing Uruguay at a greater disadvantage <sup>29</sup>.

The reported rise of anti-vaccine movements across several of the studied countries is a concern, suggesting the role that access to digital information and social networks can have in facilitating the dissemination of anti-vaccine messages and access to health information based on individual experiences (“experience-based”), rather than on scientific evidence (“evidence-based”) <sup>30</sup>. A study conducted in 2019 by Avaaz, in partnership with the Brazilian Immunization Society (SBI), indicated that 67% of the Brazilians interviewed believed in at least one inaccurate information about vaccines <sup>31</sup>.

According to the survey, respondents who believe that vaccines are partially or completely unsafe (72% and 59%, respectively) received news about vaccines via social media or messaging services <sup>31</sup>. Evidence on childhood vaccination suggests that populations in low- and middle-income countries are increasingly exposed to information relating to real or supposed vaccine harm, and to trust issues with medicine, science, and the health system <sup>8</sup>. Health personnel in high-income countries have been found to be motivated to accept vaccination as a measure to protect themselves and their patients, yet, they manifest beliefs that can pose barriers to vaccination, and particularly to the promotion of influenza vaccine among the population, including concerns about side-effects, skepticism about vaccine effectiveness, and the belief that influenza is not a serious illness <sup>32</sup>.

Our findings suggest the need for NIPs in the studied countries to be more engaged in developing communication strategies that go beyond the “information deficit” model and consider the social, cultural, and political context in which people live <sup>30,33,34</sup>. Communication strategies need to consider the specific media coverage and national experience with influenza vaccine hesitancy since the H1N1 pandemic <sup>35</sup>.

Health programs in low- and middle-income countries are being innovated to enable health authorities and providers to address demand-side determinants by introducing financial incentives and subsidies and promoting community involvement <sup>36</sup>. Our study suggests that only Chile has introduced these incentives. Poverty reduction programs based on conditional cash transfers (CCT) have prioritized increasing demand for health promotion and prevention, including vaccination <sup>37</sup>. In Brazil and Colombia, CCTs have been put in force via the *Bolsa Familia* and *Familias en Acción* programs, respectively <sup>38</sup>. Evidence has shown the effectiveness of such programs in improving children’s health status and access to preventive services, although not directed to vaccination services <sup>38,39</sup>. These programs have mostly targeted children and pregnant women, and should be considered in addressing adults with chronic conditions and older adults’ health and vaccination needs. However, CCTs have relied on recipients’ cost-benefit analyses and do not necessarily address confidence and compliance with health interventions, which depend on perceptions of the health system, cultural values, and psychological realities <sup>40</sup>.

The monitoring of vaccine hesitancy by immunization programs has been increasingly recommended as a key strategy for epidemiological surveillance. Larson et al. <sup>41</sup> propose the regular monitoring of vaccine attitudes, coupled with the monitoring of national and sub-national immunization rates, to identify populations with declining confidence and acceptance. Such recommendations are now being applied to monitor COVID-19 vaccine hesitancy, precisely indicating the groups that require special surveillance, as well as supporting health promotion and communication strategies targeting them <sup>42,43,44,45</sup>.

A limitation of this study is the bias that could have been introduced by informants regarding the situation of barriers and facilitators of influenza vaccination programs. However, these perceptions reflect the knowledge and attitudes of key personnel in charge of the programs, thus influencing the programs operation.

## Conclusions

NIPs, and specially influenza vaccination, have made significant progress in planning, purchasing, and distributing biologicals. NIPs in the studied South American countries show similar barriers and facilitators affecting their operation. These programs give most attention to the determinants of hesitancy related to improving the availability and access of biologicals among public and private providers and with the support of civil society organizations. While these strategies prioritize the convenience of vaccination, there are some opportunities to address confidence and complacency via specific strategies by integral approaches, including social, economic, and psychological incentives and tools. To this end, programs can strengthen training and incentives to improve competencies and interests of the health personnel on their role as the main promoters of vaccination. Furthermore, communication strategies must be developed to respond to the concerns of specific risk groups targeted for influenza vaccination.

## Contributors

M. A. González-Block and S. P. D. Portillo participated on the concept of the study, formal analysis, writing and review of the manuscript. J. A. Laguna, Y. Comes and D. R. Knauth contributed on the investigation, writing and review of the manuscript. P. Crocco, A. Fachel-Leal and Berenice Rodríguez-Zea collaborated on the formal analysis, investigation and writing of the original draft. L. Noboa, M. Ruoti, E. Sarti and E. Puentes contributed on the on the concept of the study, investigation, writing and review of the manuscript.

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## Conflict of interests

The authors of this manuscript have the following competing interests: E. Sarti and E. Puentes are paid employees of Sanofi Pasteur and M. A. González-Block, S. P. D. Portillo, B. Rodríguez-Zea and M. Ruoti are paid employees of Evisys Consulting. B. Rodríguez-Zea and M. Ruoti participated in the research as paid, pro-tempore employees of Evisys. S. P. D. Portillo, J. A. Laguna, Y. Comes, P. Crocco, A. Fachel-Leal, L. Noboa, D. R. Knauth participated as Evisys consultants. Both Sanofi Pasteur and Evisys participated in study design and manuscript review. This does not alter our adherence to *Cadernos de Saúde Pública* policies on sharing data and materials. There are no patents, products in development or marketed products associated with this research to declare.

## Acknowledgments

This project was financially supported by Sanofi Pasteur.

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## Resumen

La gripe es una enfermedad grave, prevenible mediante vacunas con sus correspondientes programas en países latinoamericanos, informando sobre tasas contrastadas de cobertura, desde el 29% en Paraguay al 89% en Brasil. Este artículo investiga cómo los programas nacionales contra la gripe en países seleccionados de Suramérica abordan la confianza en la vacuna y su conveniencia, así como también la complacencia hacia la enfermedad. Las barreras y facilitadores del programa de vacunación de la gripe, en su relación con la vacilación hacia la vacuna, se observaron mediante análisis documental y entrevistas a 38 a cargo de los programas nacionales de inmunización en países con alto (Brasil y Chile) y bajo desempeño (Paraguay, Perú y Uruguay). Políticas de vacunación contra la gripe, financiamiento, compras coordinación y accesibilidad fueron consideradas como buenas o aceptables. Las estrategias nacionales de comunicación se centran en la disponibilidad de la vacuna durante las campañas. En Chile, Paraguay y Uruguay la propaganda antivacunas fue mencionada como un problema. La planificación e implementación enfrentan escasez de recursos humanos en la mayoría de países a través de la mayoría de países. Los sistemas de información en salud, estadísticas y registros nominales por grupos de riesgo se encuentran disponibles con limitaciones en Perú y Paraguay. La promoción de la salud, supervisión, monitoreo y evaluación son percibidos como oportunidades para abordar la confianza y complacencia. Los programas de vacunación contra la gripe actúan principalmente sobre las barreras y facilitadores que afectan la vacilación a vacunarse mediante estrategias del lado de la demanda, las cuales en su mayor parte van dirigidas a contrarrestar la conveniencia. La confianza y complacencia son insuficientemente abordadas en todos los países, excepto en Uruguay. Los programas tienen la oportunidad de desarrollar estrategias que aborden tanto el lado de la oferta como de la demanda.

Gripe Humana; Enfermedades Prevenibles por Vacunación; Programas de Inmunización; Vacunación

## Resumo

A influenza é uma doença grave, imunoprevenível, para a qual os programas de vacinação nos países latino-americanos apresentam taxas de cobertura contrastantes, desde 29% no Paraguai até 89% no Brasil. O artigo explora de que maneira os programas nacionais de influenza em países selecionados da América do Sul lidam com a confiança e a conveniência da vacina, assim como, a acomodação em relação à doença. As barreiras e facilitadores dos programas de vacinação contra influenza foram observados em relação à hesitação vacinal, através de análise documental e entrevistas com 38 autoridades de programas nacionais de imunização em países com desempenho alto (Brasil e Chile) e baixo (Paraguai, Peru e Uruguai). As políticas de vacinação contra influenza, financiamento da compra de vacinas, coordenação e acessibilidade são consideradas boas ou aceitáveis. As estratégias nacionais de comunicação estão concentradas na disponibilidade durante campanhas. No Chile, Paraguai e Uruguai, a propaganda antivacina foi mencionada enquanto problema. A programação e a implementação enfrentam escassez de recursos humanos na maioria dos países. Dados estatísticos, sistemas de informação em saúde e registros nominais de grupos de risco estão disponíveis, com limitações no Peru e no Paraguai. A promoção da saúde, supervisão, monitoramento e avaliação foram percebidas como oportunidades para tratar da confiança e da acomodação. Os programas de vacinação contra influenza identificam e agem sobre a maioria das barreiras e facilitadores que afetam a hesitação vacinal através de estratégias do lado da oferta, tratando principalmente da conveniência da vacina. A confiança e a acomodação não são tratadas de maneira suficiente, com exceção notável do Uruguai. Os programas têm a oportunidade de desenvolver abordagens que integram os lados da oferta e da procura.

Influenza Humana; Doenças Preveníveis por Vacina; Programas de Imunização; Vacinação

Submitted on 15/Mar/2021

Final version resubmitted on 12/Sep/2021

Approved on 24/Sep/2021