



# A human rights approach to understanding provider knowledge and attitudes toward the human papillomavirus vaccine in São Paulo, Brazil



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## ABSTRACT

**Objective:** To determine the extent to which human rights considerations influence the attitudes of healthcare providers in Brazil with regard to access to the human papillomavirus (HPV) vaccine for females over 13 and males of all ages.

**Methods:** From May to August 2015, we conducted a cross-sectional study among healthcare providers in eight public health clinics in the city of Mauá, Brazil. Frequency analysis was conducted across three subject areas: access, knowledge, and attitudes.

**Results:** A total of 154 surveys were analyzed. Providers reported their perception that Brazilians do not have equal access to health (80%) and the vaccine exclusions limit an individual's right to health (72%). Providers stated it is medically effective to vaccinate females over the age of 13 (77%), these females *should* be vaccinated (84%), and they *would* vaccinate them (82%). Similar responses were reported for males.

**Conclusion:** Cervical cancer is the 4th leading cause of cancer among females in Brazil. Most cervical cancer cases are caused by persistent HPV infection, preventable through HPV vaccination. Limiting access to the HPV vaccine when medically efficacious is a perceived infringement of an individual's right to health. Brazil has a constitutional responsibility to reduce these access barriers.

## 1. Introduction

Cervical cancer is a leading cause of cancer mortality in the world. In Brazil, it is the 4th leading cause of cancer and the 6th cause of cancer-related death among females. In 2018, 16,298 new cases and 8,079 deaths related to cervical cancer were estimated in the country [1].

The human papillomavirus (HPV) types 16 and 18 are the strains responsible for up to 70% of all cervical cancer cases [2]. In Brazil, there are two prophylactic vaccines available to prevent oncogenic HPV infection [2–4]. HPV vaccines are most effective when administered prior to becoming sexually active and possible exposure to HPV, as they do not treat existing infections [3].

In March 2014, the Brazilian Ministry of Health's National Immunization Program instituted a nationwide initiative that offered females ages 9–13 a three-dose series of the quadrivalent HPV vaccine at no cost to recipients through Brazil's Unified Health System [5]. In 2015, the target population was expanded to include females 9–26

living with HIV/AIDS [5]. Then in 2016, the dosing schedule was reduced to two doses to reflect global recommendations and best practices [5]. In 2017, eligibility was expanded to include females ages 9–14, males 11–14, and both females and males 9–26 living with HIV/AIDS or immunodeficiency; however, these changes still exclude most females and males older than 14 from participation, despite the vaccine's proven efficacy up to age 45 [5,6].

While HPV vaccination rates are relatively high in Brazil (82.6% coverage for dose 1 and 52.8% for dose 2 among females ages 9–14 in 2017) there is a disconnect between vaccine uptake and accessibility of the HPV vaccine [5,7,8]. The National Immunization Program does not permit the Unified Health System to provide the HPV vaccine to those outside of the age targets largely due to the limited cost-effectiveness of vaccinating those already potentially exposed to HPV; though, individuals can be vaccinated if the vaccine is independently purchased [5]. This issue of accessibility is significant, as the Brazilian Constitution details a distinct right to health through the Unified Health System for all individuals regardless of sex, age, or socioeconomic status,

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enforceable through article 196, which states, “Health is a right of all and a duty of the State and shall be guaranteed by means of social and economic policies aimed at reducing the risk of illness” [9]. Brazil has also ratified numerous international human rights treaties that explicitly include the right to health, namely the International Covenant on Economic, Social and Cultural Rights. A key component of the right to health is the notion of accessibility, which consists of the non-discriminatory provision of healthcare goods, facilities, and services to the entire population, including financial and information accessibility [10].

The current National Immunization Program's HPV vaccine policies limit Brazilians' right to health by largely excluding those over the age of 14, despite the vaccine's proven efficacy through age 45 [6]. The high price of the HPV vaccine and cost-effectiveness of vaccinating HPV-exposed populations are acknowledged as barriers to widespread expansion of the vaccine; however, the policy exclusions prevent some individuals, for whom HPV vaccination could be medically efficacious, from accessing important health services and information. These limits on health decision-making are not justifiable [3,5]. The objective of this study was to determine the extent to which human rights considerations influence the attitudes of healthcare providers in Mauá, Brazil with regard to HPV vaccine accessibility for females over 13 and males of all ages.

## 2. Methods

From May to August 2015, we conducted a cross-sectional study using a paper-based, self-administered survey in eight public health clinics located in the city of Mauá, a suburb of São Paulo, Brazil. The research study was reviewed by the Emory University Institutional Review Board and the Mauá Municipal Institutional Review Board before the study began and was found to be exempt, as the project did not meet the definition of research with human subjects and was classified as public health practice.

The city of Mauá is an industry-based, low-income community [11]. There are a total of 23 health clinics and one hospital, among other health facilities, in the city [11]. Healthcare providers were recruited within the following clinics: Jardim Mauá, Kennedy, Santista, São João, Oratorio, Feital, Zaira I, and Zaira II. Administrators at each clinic were contacted directly by a community partner, who approached each clinic and discussed the opportunity and feasibility for participation in the study. Participant recruitment was then facilitated by administrators within each clinic who identified potential participants. Inclusion criteria required that participants were: 1) a Brazilian citizen and 2) a practicing provider with clinical knowledge and direct contact with male and female patients of reproductive age. Participants included physicians, nurses, nurse assistants, and community health agents. All participants shared responsibility for communicating with their patients and guardians about the HPV vaccine; nurses and nurse assistants were responsible for administering the vaccine at the selected clinics.

The survey instrument was based upon previous studies analyzing healthcare providers' knowledge, attitudes, and practices regarding HPV vaccine implementation [12–16]. It was adapted to reflect the 2014 Brazilian HPV vaccination program and eligibility requirements. The survey was originally written in English. It was translated into Portuguese, then back translated by a native Portuguese speaker. Following pilot testing and revisions, the survey was finalized in paper form that required approximately 30–45 min to complete.

To ensure comprehension and to account for varying levels of literacy, all interested participants received verbal written informed consent information in English and Portuguese prior to beginning the survey. The lead study investigator explained study procedures in English and requested verbal assent; the same information was then translated into Portuguese by study staff who were native speakers. The verbal informed consent process was conducted individually or in group settings, as preferred by clinic staff. Written informed consent

was included in Portuguese on the cover page of the survey instrument and repeated again on the instrument. Signed consent forms were immediately collected and stored in a secure file folder; participants also retained a copy of the written version of the informed consent for their personal records.

All participants were assigned a unique study identification number to be maintained only by study staff. This was implemented to ensure participant confidentiality. Participants had the ability to complete the survey immediately or at another time.

Participants were instructed during the introduction to the study that their answers were opinion or knowledge based and they should answer to the best of their ability. If a participant did not know the answer, they were asked to leave the question blank. All completed surveys were collected from participants or administrators and stored in a second secure file folder to ensure participant confidentiality.

All data were manually entered in a password protected Excel-based data repository. Questions with “select all” answers were separated into individual variables with yes/no responses. If a participant did not confirm an answer by explicitly selecting the option, the response was recorded as “no.” Duplicate data entry and data quality verification was conducted to prevent potential data errors and facilitate data assurance.

Frequency analysis was conducted across the three main subject areas: access, knowledge, and attitudes. Comparisons focused on variance in responses based on occupation. The main outcome of analysis considered whether providers believed the population exclusions and eligibility requirements of the HPV vaccination program limit an individual's right and access to health, which also included the perception of whether patients and guardians have sufficient knowledge of the HPV vaccine. Comprehensive knowledge about the HPV vaccine's medical effectiveness and attitudes toward eligibility were analyzed in comparison to the main outcome of interest related to the right to health. Data analysis was conducted using Statistical Analysis System (SAS) 9.4 (SAS Institute Inc., Cary, NC, USA).

## 3. Results

A total of 171 surveys were completed; 17 were excluded from analysis due to the respondent not meeting eligibility requirements. A remaining sample of 154 providers was analyzed. Approximately 25 providers were approached at each of the 8 facilities, though an accurate response rate cannot be determined as the surveys were often administered in group settings. The participants were primarily female (88%) and ages ranged from 19 to 69 years old with a mean age of 38 (Table 1). Almost half of the participants were community health agents (49%); other occupations included nursing assistants (23%), nurses (14%), and physicians (13%). The majority (81%) of participants had 15 or fewer years of experience since completing their medical training.

### 3.1. Access

Providers showed a near consensus (97%) that Brazilians have a right to health, though a majority (80%) reported their perception that Brazilians do not have equal access to this right. Providers (73%) reported that the population exclusions of the HPV vaccination program limit an individual's right to health. (Table 2).

### 3.2. Knowledge

There was a perceived lack of knowledge about the HPV vaccine among parents or guardians (95%) and patients (95%) alike (Table 2). However, the overall importance of the HPV vaccine was recognized among all providers. A majority agreed it is medically effective to vaccinate females over the age of 13 (77%) and males (69%) (Table 2). Providers with higher levels of education (physicians and nurses) were more likely to acknowledge the medical effectiveness of the HPV vaccine for females over 13 (90% and 91% respectively) and males (74%

**Table 1**  
Demographics of healthcare providers surveyed about HPV and the HPV vaccine in 8 public health clinics within Mauá, Brazil, 2015, n = 154.

	Mean	Standard Deviation
<b>Age</b>	38	9.9
Missing	0	
	<b>N</b>	<b>%</b>
<b>Gender</b>		
Male	19	12.3
Female	135	87.7
Missing	0	
<b>Career</b>		
Physician	20	13.0
Nursing Assistant	36	23.4
Nurse	22	14.3
Community Health Agent	76	49.4
Missing	0	
<b>Areas of Expertise</b>		
Pediatrics	6	3.9
Obstetrics/Gynecology	5	3.3
General Practice	9	5.8
Oncology	1	0.7
Family and Community Medicine	46	29.9
Other	30	19.5
Does Not Apply	58	37.7
Missing	12	7.8
<b>Years of Experience</b>		
Under 5 years	48	31.2
5–15 years	76	49.4
16–25 years	11	7.1
More than 25 years	6	3.9
Missing	13	8.4

and 86% respectively) compared to nursing assistants and community health agents, though these differences were not found to be statistically significant (Table 3).

3.3. Attitudes

Attitudes regarding vaccination varied largely by profession and did not necessarily correspond with knowledge about the HPV vaccine (Table 3). Physicians and nurses reported that females over 13 should receive the vaccine (90% and 95% respectively), as well as males (95% and 95% respectively), which demonstrates higher concordance than when asked about the medical effectiveness of the vaccine for these populations. Among community health agents, more reported that

**Table 2**

Attitudes toward the constitutional ‘right to health’ and HPV vaccination of high-risk populations among participating healthcare providers in 8 public health clinics within Mauá, Brazil, 2015.

	Yes n (%)	No n (%)	Do not Know n (%)	Missing n
<b>Right to Health</b>				
Do you believe Brazilians have a right to health? n = 152	148 (97.4)	4 (2.6)	0 (0)	2
Do you believe all Brazilian citizens have equal access to health? n = 150	29 (19.3)	120 (80.0)	1 (0.7)	4
Do you believe the population exclusions of the HPV vaccination program limit an individual's right to health? n = 149	108 (72.5)	34 (22.8)	7 (4.7)	5
Do you believe parents or guardians have sufficient knowledge about the HPV vaccine? n = 150	6 (4.0)	142 (94.7)	2 (1.3)	4
Do you believe patients, both male and female, have sufficient knowledge about the HPV vaccine? n = 152	6 (4.0)	144 (94.7)	2 (1.3)	2
<b>Female Vaccination over 13 yrs.</b>				
Do you think it is medically effective to vaccinate females over the age of 13? n = 150	115 (76.7)	20 (13.3)	15 (10.0)	4
Do you think females over the age of 13 should be vaccinated for HPV? n = 150	126 (84.0)	13 (8.7)	11 (7.3)	4
Would you vaccinate a female over the age of 13 for HPV? n = 150	123 (82.0)	13 (8.7)	14 (9.3)	4
<b>Male Vaccination</b>				
Do you think it is medically effective to vaccinate males? n = 149	103 (69.1)	16 (10.7)	30 (20.1)	5
Do you think males should be vaccinated for HPV? n = 148	119 (80.4)	11 (7.4)	18 (12.2)	6
Would you vaccinate a male for HPV? n = 148	108 (73.0)	20 (13.5)	20 (13.5)	6

females over 13 should receive the vaccine (84%) than compared to males (76%), while nursing assistants viewed both groups equally (74% for females over 13 and 74% for males). Again, the community health agents and nursing assistants reported higher rates of approval for these populations to receive the vaccine than demonstrated knowledge related to the effectiveness of the vaccine. When asked if the provider would administer the vaccine, support varied among those professionals responsible for administering the vaccine at the selected clinics. Most nurses would administer the vaccine to females over 13 and males (86% and 82% respectively), while only 60% of nursing assistants would administer the vaccine to females over 13 (p = .0017 for comparison of all provider types to administer vaccine to females over 13) and only 53% would administer for males (p = .0140 for comparison of all provider types to administer vaccine to males). Overall, there was a slight decrease among providers who would administer the vaccine to females over 13 (82%) compared to whether the females should receive the vaccine (84%); larger variance was reported for male vaccinations (73%–80%, respectively).

4. Discussion

This is the first study to consider the Brazilian HPV Immunization Program and implementation from a provider's perspective, through a human rights lens. While the results are specific to the city of Mauá, they offer insights as to what factors influence the sexual and reproductive healthcare of all females and males over the age of 13, specifically in terms of access to and administration of the HPV vaccine. Our results demonstrate the provider perspective that excluded populations should receive the HPV vaccine. Recognizing the financial burden of proactively offering the HPV vaccine to females and males through age 45 within the Unified Health System, we recommend that Brazil offers the vaccine on demand up to age 45 for both sexes.

Among our participating providers, there was an explicit understanding of the right to health. Providers recognized not all individuals have equal access to or knowledge of the health services guaranteed to them by the Constitution and international law and many believed the eligibility requirements of the HPV vaccination program that exclude certain populations and inhibit access, infringe upon an individual's right to health. What follows is a near consensus among participating providers that supports providing the vaccine to ineligible populations, suggesting a provider's interpretation of the constitutional right to health does influence their interpretation of the Brazilian HPV Immunization Program strategy.

However, the cost-effectiveness of vaccinating older adolescents and adults who are presumably not HPV-naïve is a critical aspect of national policy making, especially within an already strained public health

**Table 3**

Attitudes toward the HPV vaccination of high-risk populations stratified by healthcare profession in 8 public health clinics within Mauá, Brazil, 2015.

	Physician n/N (%)	Nurse n/N (%)	Nursing Assistant n/N (%)	Community Health Agent n/N (%)	Total n/N (%)	p value
<b>Female Vaccination over 13 yrs.</b>						
Medically Effective to Receive	17/19 (89.5)	19/21 (90.5)	25/35 (71.4)	54/75 (72.0)	115/150 (74.7)	0.1428
Should Receive	17/19 (89.5)	20/21 (95.2)	26/35 (74.3)	63/75 (84.0)	126/150 (84.0)	0.1828
Would Administer	17/19 (89.5)	18/21 (85.7)	21/35 (60.0)	67/75 (89.3)	123/150 (82.0)	0.0017
<b>Male Vaccination</b>						
Medically Effective to Receive	14/19 (73.7)	18/21 (85.7)	22/35 (62.9)	49/74 (66.2)	103/149 (69.1)	0.2803
Should Receive	18/19 (94.7)	20/21 (95.2)	25/34 (73.5)	56/74 (75.7)	119/148 (80.4)	0.0581
Would Administer	17/19 (89.5)	18/22 (81.8)	18/34 (52.9)	55/73 (75.3)	108/148 (73.0)	0.0140

system. While the Unified Health System is cited as a Brazilian success story in terms of improving maternal and child health through increased antenatal care and strengthened primary care services through the Family Health Program, it also faces great challenges, including chronic underfunding and limited resources, which lead to excessive wait times for care services disproportionately experienced in lower-income communities [17–21]. In addition, studies have shown multi-cohort immunization for ages 9–14 is considered cost-effective but vaccinating beyond this age through “catch up” vaccines requires further investigation [22,23]. As such, alternative strategies to reduce costs while still expanding eligibility to all those who express a desire to receive the vaccination based on proven medical efficacy and recommendations are required.

One method to increase financial access to the HPV vaccine is through continued domestic manufacturing of the product. In 2013, a technology transfer was formalized between one of Brazil's leading scientific institutions, the Butantan Institute in São Paulo, and Merck, Sharp & Dohme Corporation to produce the HPV vaccine domestically and lower costs [7]. With this partnership, it is anticipated that costs of implementing the Brazilian HPV Immunization Program will lower, as the vaccine will transition to domestic production. This legal process of technology transfer has been a focus of investment within Brazil over the past few decades with the goal of increasing accessibility and affordability of vaccines for the entire population [24]. Domestic manufacturing of the influenza vaccine is an example of how long-term costs can be lowered through a technology transfer, which not only enabled Brazil to produce the influenza vaccine within their own production plant, but can also facilitate preparedness for public health outbreaks, such as the avian influenza in 2003, and decrease the potential negative health impacts of this type of crisis [25]. Domestic production could arguably increase access to the HPV vaccine throughout the population.

An additional opportunity to mitigate costs is the prospect of reducing the number of required doses of the vaccine from two to one. Early outcomes of current randomized clinical control trials have demonstrated similar protection from HPV with one dose as seen with three doses [26,27]. Through further research, it is possible that a one dose schedule can be incorporated into the Brazilian HPV Immunization Program, which would reduce overall costs of implementation and allow for expansion of the vaccine to those outside of the current target population.

These two strategies are feasible options to promote cost-effective delivery of the HPV vaccine in Brazil that can also facilitate an individual's right to access health services. Yet, in the interim, while the current HPV vaccination program continues its expansion to both females and males through age 14, it is imperative that the Ministry of Health proactively monitor and evaluate the vaccine licensure and adapt the Brazilian HPV Immunization Program strategy to reflect international approvals, as these recommendations continue to change, evident by the recent approval of the vaccine use up to age 45 [6]. Promisingly, political discussion about the efficacy and need for expanding age limits has begun in Brazil, most recently with an open public debate led by an elected official in October 2019 [28].

The study includes limitations in terms of both study design and methodology. The survey was conducted in one region of Brazil and includes a small sample size of 154 healthcare providers. However, the choice of Mauá as the study site offers insights into the attitudes among providers who serve predominately low-income populations and may be transferable for future outreach within these populations across Brazil. The language used in the survey instrument may have been at a reading comprehension level too high for our target participants. In addition, the community health agents were able to complete their surveys together in a large room. Participants were asked not to discuss questions or answers, but this could not be ensured. If unable to complete the survey immediately, participants had the option to complete the survey at another time. This flexibility introduced the possibility that participants could research the questions they could not independently answer. Likewise, participation in the survey was voluntary. As such, those who chose to participate may have been more knowledgeable or opinionated about the theme than those who did not choose to participate. Finally, the research was conducted from May–August 2015 when the three-dose vaccine was limited to females ages 9–13 and before the Brazilian HPV Immunization Program policies changed to a two-dose schedule and eligibility expanded to include males ages 11–14 [5]. Additional studies are recommended to review if provider understanding of access, knowledge and attitudes have changed and to further investigate patient and/or guardian knowledge and attitudes toward the HPV vaccine since the program expansion in 2017.

## 5. Conclusion

Not only does Brazil guarantee an innate right to health in its Constitution that serves as the foundation under which the Unified Health System was established, but as a matter of its international human rights obligations, Brazil is expected to *respect, protect* and *fulfill* this right to health for its citizens, specifically in terms of the “prevention, treatment and control of diseases” [10]. Brazil must *respect* and not interfere with an individual's pursuit of health, *protect* citizens from preventable harm, and undertake positive action to *fulfill* the right to health [10]. Provision of the HPV vaccine is one such activity. Based on our research findings, we suggest that Brazil may not be meeting its national and international responsibilities through the conduct of the Brazilian HPV Immunization Program exclusions that preclude females and males over the age of 14 from receiving the vaccine, which can reduce their likelihood of contracting HPV and developing HPV-related cancers. Providers recognize the Brazilian constitutional right to health, inequities in accessing this right, and share the perception that the population exclusions in the HPV Immunization Program limit an individual's right to health. Providers also report the vaccine *should* be offered to these ineligible groups, which suggests that providers view expanding vaccination as a means to facilitate access to an individual's constitutional right to health. As such, it is important for Brazil to consider its policies and State obligations. It is justifiable to limit populations from receiving services in resource-constrained environments

due to costs and limited capacity, but the State also has a duty through *progressive realization* to consider how these policies can be changed in the future with additional resources and must proactively take steps toward this goal [10,29,30].

### Author contributions

Meredith H. Kruse was responsible for the development of the study instrument, collection of data, the analysis and interpretation of data, drafting of the manuscript, and critical revisions. Robert A. Bednarczyk was responsible for development of the study instrument, the analysis and interpretation of data, drafting of the manuscript, and critical revisions. Dabney P. Evans was responsible for the study design, development of study instruments, drafting of the manuscript, and critical revisions. All authors have read and approved the manuscript.

### Declaration of competing interest

None.

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### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.pvr.2020.100197>.

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