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## Acceptability and uptake of HPV vaccine in Argentina before its inclusion in the immunization program: A population-based survey

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### ARTICLE INFO

#### Article history:

Received 17 August 2011

Received in revised form 7 December 2011

Accepted 9 January 2012

Available online xxx

#### Keywords:

HPV vaccination

Acceptability

Uptake

Argentina

### ABSTRACT

In Argentina, human papillomavirus (HPV) vaccination was approved in 2006, but not included in the National Immunization Program. In 2008 a mass media campaign was carried out by a cancer Non-Governmental Organization (NGO), but it was stopped due to criticisms about the publicity. In October 2011 the Ministry of Health (MoH) has introduced HPV vaccination in the National Immunization Program. In this context, to assure high HPV vaccine coverage, evidence is needed on factors both associated to vaccine acceptability and uptake. In 2009–2010 we carried out a population-based survey among a representative sample of 1200 women aged 18–49 years from the Metropolitan Area of Buenos Aires. The objective was twofold: first to analyze socio-demographic determinants of women's knowledge on HPV vaccine and secondly, determinants of actual HPV vaccine uptake and acceptability in Argentina after the above-mentioned vaccine advertising shown in mass media in the year 2008.

We analyzed vaccine uptake/acceptability separately for women and for their daughters aged 9–15, and willingness to vaccinate one's daughter younger than 9 to receive future HPV vaccination.

Results of the 1200 women interviewed, 438 women (36.5%) knew the HPV vaccine and 303 (25%) remembered the mass media advertisement about HPV vaccination. When asked whether she would get vaccinated after having seen/heard the advertisement, around 75% ( $n=226$ ) of women answered surely/probably yes. No significant differences in socio-demographic characteristics were found among women who would or not get vaccinated. When surveyed, 6 women had been vaccinated. Main reasons for non-vaccination were: "Doctor did not mention/recommend it" (34.1%) and "Vaccine is too expensive" (15.7%). No woman had had their 9–15 year-old daughter vaccinated. Among women who only had at least one daughter under 9 ( $n=278$ ), 74% answered that they would get their daughter vaccinated if they were pre-adolescents.

The conclusion is that, in Argentina, the potential acceptability of the vaccine is high, given that there is acceptance among the professional community, physicians recommend it, and vaccine is affordable.

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### 1. Introduction

The scientific recognition of the causal relationship between human papilloma virus (HPV) and cervical cancer, and the development of two vaccines against HPV are a major breakthrough in preventive medicine. Both vaccines have demonstrated efficacy of over 90% against infection, due to genotypes 16 and 18 [1,2], that cause around 70% of cervical cancers worldwide [3].

One key issue to assure vaccine effectiveness is obtaining high coverage levels, which is directly linked to vaccine acceptability.

Extensive research has been carried out to measure vaccine acceptability and factors that predict it. An important portion of these studies was carried out in the pre-licensure period, and their results are being confirmed in the post-licensure years. In general, results have shown high levels of vaccine acceptability across different settings and countries [4–7]. However, now that the vaccine has been available in many countries for several years, studies that have analyzed actual uptake of HPV are showing that, in some settings, HPV vaccine initiation and dose completion might be lower than expected [8–10]. In the USA, for example, the low HPV vaccine coverage has raised the issue of whether HPV vaccines will actually impact the rates of cervical cancer in that country at a population level [8]. This evidence suggests that acceptability is not automatically translated into uptake, and that several factors, including vaccine cost, access to the health care system, vaccine policy and mass media mediate the relationship between them.

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In Argentina, 2000 women die annually due to cervical cancer. HPV vaccination of young girls from low socio-economic groups would constitute an important measure to significantly reduce the burden of this disease. In this country, Gardasil® and Cervarix® were approved by ANMAT (the Argentinean FDA) in 2006 and 2007, respectively, but at that time, were not included in the publicly funded National Immunization Program. In 2008, a mass media publicity campaign to promote the vaccine was carried out during several months by an NGO involved in cancer control, but it was stopped due to public criticisms. The main criticism of the publicity was that it did not mention that the vaccine was not included in the National Immunization Program and, therefore, was to be paid. At that time, the National Ministry of Health (MoH) publicly stated that the first step to reduce cervical cancer was to strengthen cytology-based screening and important measures were carried out in that direction [11]. Since October 2011, HPV vaccination is included in the National Immunization Program [12]. We consider that it is crucial to understand factors both associated to vaccine acceptability and uptake in this context, so as to provide program planners with evidence on modifiable targets for future strategies attempting to assure high levels of HPV vaccine coverage. While analysis of factors influencing vaccine acceptability and uptake have been published for developed countries [10,13], no published study has analyzed both acceptability and actual vaccine uptake in a middle-income country like Argentina, several years after vaccine licensure and before inclusion in the National Immunization Program.

In 2009–2010 we carried out a population-based survey among a representative sample of 1200 women aged 18–49 years from the Metropolitan Area of Buenos Aires (AMBA). The aim of the study was two-fold: first, to analyze socio-demographic determinants of women's knowledge on HPV vaccine and secondly, determinants of actual HPV vaccine uptake and acceptability in Argentina after the above-mentioned vaccine advertising shown in mass media in the year 2008. We analyzed vaccine uptake/acceptability separately for women and for their daughters aged 9–15. In addition, we analyzed willingness to vaccinate daughters aged less than 9 years once they reach age for vaccination.

## 2. Methodology

The study were conducted by CEDES (Centro de Estudios de Estado y Sociedad) in collaboration with CEDOP (Centro de Estudios de Opinión Pública), School of Social Sciences, University of Buenos Aires. It was supported by Program for Appropriate Technology in Health (PATH) an international non-profit organization.

### 2.1. Study design

We carried out a population-based survey of 18–49 year-old women in the AMBA, the principal urban agglomeration in Argentina, both because of its role in the economic structure of the country and because around one-third of the total country population is concentrated in this area. From October 15, 2009 to January 31, 2010, 1200 interviews were performed. Eligibility criteria included being women between 18 and 49 years old and residing in AMBA. Women that did not fall within the age range or who suffered from a mental or physical handicap were excluded from the survey.

### 2.2. Sampling design

We built a random area sample in three stages: area units, households, and individuals. The first stage consisted of the stratified selection of geographical units (GU) used by National Institute of Statistics and Census (INDEC); a random selection of 150 GUs,

with probability proportional to size, was carried out. The selection was systematic, with two random starting points, from the ordered listing of GUs. The second stage consisted of the determination, using random coordinates, of a block within the GU that was considered the center of the sampling point. A sampling point was defined as a collection of blocks to be walked around by an interviewer from a starting address randomly selected. It was formed by a central block, numbered 1, and the 8 blocks surrounding it, numbered 2–9. The third stage was the fieldwork itself, which was carried out by trained interviewers as follows. From a starting address, the interviewer began her walk calling at all the households, in search of an eligible woman per household. If more than one was eligible woman was found, the interviewer enrolled only one, using the last birthday rule. If nobody was home or the selected woman was out, the interviewer made up to two additional visits to contact the woman. When an interview was complete in one house, the interviewer skipped 3 households and knocked at the 4th door. The random character of the procedure was assured by the random selection of the starting doorbell.

The study was explained verbally to women from each selected household by trained female interviewers who had each completed at least secondary education. They asked women to sign an informed consent before applying a structured questionnaire in a face to face interview carried out in women's houses. To assure privacy, each woman chose where the interview would be carried out. Contacted women were given a leaflet about cervical cancer prevention. The study protocol and questionnaire were approved both by the Ethical Committees of a local hospital (CEMIC) and PATH.

### 2.3. The questionnaire

The questionnaire included questions about women's socio-demographic and economic characteristics; and their reproductive health history. The questionnaire was pre-tested on a sample of 10 women and it was assessed for face and content validity by health/social research experts.

All 1200 interviewed women were asked whether they had heard about HPV vaccine. Women who had heard about HPV vaccination ( $n=470$ ) were asked about the use of the vaccine and whether they had been vaccinated. In addition, these women were asked if they remembered the mass media publicity. The subgroup of women who did remember ( $n=303$ ) was asked about their willingness to get vaccinated after having seen or listened to the advertisement. Women who responded 'Surely yes' or 'Probably yes' to that question ( $n=226$ ) were asked about their reasons for getting vaccinated after having seen or heard the advertisement.

Women with daughters aged 9–15 years ( $n=112$ ) were asked about their daughter's HPV vaccination status and women with daughters younger than 9 years old ( $n=100$ ) were asked about their willingness to vaccinate their daughters once they reach the recommended age (11–13). In both cases, i.e., both those who would and would not get their daughters vaccinated, were asked for their reasons.

Women who had heard about HPV vaccination ( $n=470$ ), were asked about their own HPV vaccination status (vaccine uptake) and about reasons for their decision to get vaccinated or not.

### 2.4. Analysis

Data were analyzed using STATA 10.1 basic descriptive statistics and frequency calculations were performed on all variables.

Knowledge about HPV vaccination was categorized as adequate or inadequate: (a) adequate: women who had heard about the HPV vaccine and mentioned that vaccine was to prevent cervical cancer,

**Table 1**  
Knowledge about HPV vaccination according to socio-demographics characteristics and reproductive health history.

	Knowledge about HPV vaccination			P-value
	Total N (%)	Adequate N (%)	Inadequate N (%)	
Total	1200 (100.0)	438 (100.0)	762 (100.0)	
Age				
18–25	257 (21.4)	81 (18.5)	176 (23.1)	0.004
26–39	576 (48.0)	198 (45.2)	378 (49.6)	
40–49	367 (30.6)	156 (36.3)	208 (27.3)	
Education level <sup>a</sup>				
Primary school incomplete–complete/secondary incomplete	460 (38.4)	135 (30.8)	325 (42.7)	0.000
Secondary complete/tertiary incomplete	543 (45.3)	195 (44.5)	348 (45.7)	
Tertiary complete	196 (16.3)	108 (24.6)	88 (11.6)	
Marital status <sup>a</sup>				
Without partner	229 (19.1)	69 (15.8)	160 (21.0)	0.027
With partner	970 (80.9)	368 (84.2)	602 (79.0)	
Head of household				
Yes	252 (21.0)	98 (22.4)	154 (20.2)	0.375
No	948 (79.0)	340 (77.6)	608 (79.8)	
Health insurance <sup>b</sup>				
Public	452 (37.7)	134 (30.6)	318 (41.8)	0.000
Private	746 (62.3)	303 (69.4)	443 (58.2)	
Socio-economic level <sup>c</sup>				
Low	785 (65.8)	258 (59.0)	527 (69.7)	0.000
Medium	312 (26.2)	129 (29.5)	183 (24.2)	
High	96 (8.0)	50 (11.5)	46 (6.1)	
Ever used contraception methods <sup>a</sup>				
No	240 (20.0)	72 (16.4)	168 (22.1)	0.019
Yes	959 (80.0)	366 (83.6)	593 (77.9)	
Ever pregnant <sup>a</sup>				
No	220 (18.4)	84 (19.2)	136 (17.8)	0.554
Yes	979 (81.6)	353 (80.8)	626 (82.2)	
Pap smear in the last 3 years				
No (+3 years/never)	225 (18.7)	60 (13.7)	165 (21.7)	0.001
Yes	975 (81.3)	378 (86.3)	597 (78.3)	

<sup>a</sup> Missing data for 1 case.

<sup>b</sup> Missing data for 2 cases.

<sup>c</sup> Missing data for 7 cases.

HPV, cancer or genital warts; and (b) inadequate: women who had not heard about HPV vaccine or who had heard about it, but thought that vaccine was to prevent HIV, other unspecific diseases or did not know.

Acceptability of HPV vaccination was measured through (a) willingness to get vaccinated: women who would get vaccinated after having seen or heard the advertisement; and (b) willingness to vaccinate their daughters younger than 9: women who would have their daughters vaccinated once they reach the recommended age (11–13).

Univariate and stepwise multivariate logistic regression analyses were used to evaluate the effects of the socio-economic and reproductive health characteristics of women on knowledge about HPV vaccine, by estimating odds ratios and their 95% confidence intervals. The model used an entry criterion of  $P=0.050$  and removal criterion of  $P=0.051$  to calculate adjusted odds ratios. Variables included in the model were: age, education level, health insurance, socio-economic level, contraception use and Pap smear in the last 3 years.

We did specific bivariate analysis to evaluate factors associated to willingness to get vaccinated among women who recalled the advertisement. Although univariate and multivariate logistic regression analysis to evaluate the effects of socio-economic and reproductive health characteristics on willingness to get vaccinated were planned to be used, these were not performed as no association was found in the bivariate analysis.

Associations between socio-demographic characteristics and vaccine uptake were not analyzed as only 6 women from the sample had been vaccinated at the moment of the survey, and no young females aged 9–15 had been vaccinated at all.

### 3. Results

#### 3.1. Knowledge about HPV vaccination

Of the 1200 interviewed women, 438 (36.5%) had adequate knowledge about HPV vaccination. Socio-demographic characteristics of women are presented in Table 1. Compared to women with inadequate knowledge about HPV vaccination, those who had adequate knowledge were older (aged 40–49), better educated, had private health insurance and were from a higher socio-economic level. A higher proportion of women who knew the vaccine had ever used contraception methods and had had Pap smears in the previous 3 years. In multivariate analysis, women aged 40–49 (OR: 1.5; 95% CI: 1.1–1.9), with secondary complete/tertiary incomplete level of education (OR: 1.3; 95% CI: 1.1–1.7) or tertiary complete (OR: 2.7; 95% CI: 1.9–3.8) and who had Pap smears in the previous 3 years (OR: 1.6; 95% CI: 1.1–2.2) were more likely to have adequate knowledge about HPV vaccine (Table 2).

#### 3.2. Acceptability and HPV vaccination status

One quarter of total women ( $n=303$ ) were able to recall the mass media advertisement about HPV vaccination. Socio-economic and reproductive health characteristics of women both who recalled and did not remember the advertisement are presented in Table 3. Significant differences were found between groups regarding level of education, health insurance, socio-economic level and reproductive health characteristics (ever used contraception methods and had had Pap smears in the previous 3 years). Education level, health insurance, socio-economic level, use of contraception

**Table 2**  
Univariate and multivariate analysis: knowledge about HPV vaccination, socio-demographic characteristics and reproductive health history.

	Adequate N (%)	Knowledge about HPV vaccination					
		Univariate analysis			Multivariate analysis		
		OR	95% IC	P-value	OR	95% IC	P-value
Total = 1200	438 (36.5)						
Age							
18–25	81 (31.5)	1			1		
26–39	198 (34.4)	1.1 (0.8–1.5)		0.420			
40–49	156 (43.3)	1.7 (1.2–2.3)		0.003	1.5 (1.1–1.9)		0.003
Education level <sup>a</sup>							
Primary school incomplete-compl./secondary incomplete	135 (29.3)	1			1		
Secondary compl./tertiary incomplete	195 (35.9)	1.3 (1.0–1.8)		0.028	1.3 (1.1–1.7)		0.038
Tertiary complete	108 (55.1)	2.9 (2.1–4.2)		0.000	2.7 (1.9–3.8)		0.000
Marital status <sup>a</sup>							
Without partner	69 (30.1)	1					
With partner	368 (37.9)	1.4 (1.1–1.9)		0.028			
Health insurance <sup>b</sup>							
Public	134 (29.6)	1					
Private	303 (40.6)	1.6 (1.3–2.1)		0.000			
Socio-economic level <sup>c</sup>							
Low	258 (32.8)	1					
Medium	129 (41.3)	1.4 (1.1–1.9)		0.008			
High	50 (52.1)	2.2 (1.4–3.4)		0.000			
Ever used contraception methods <sup>a</sup>							
No	72 (30.0)	1					
Yes	366 (38.2)	1.4 (1.1–1.9)		0.019			
Ever pregnant <sup>a</sup>							
No	84 (38.2)	1					
Yes	353 (36.1)	1.1 (0.8–1.5)		0.554			
Pap smear in the last 3 years							
No (+3 years/never)	60 (26.7)	1			1		
Yes	378 (38.8)	1.7 (1.3–2.4)		0.001	1.6 (1.1–2.2)		0.008

<sup>a</sup> Missing data for 1 case.<sup>b</sup> Missing data for 2 cases.<sup>c</sup> Missing data for 7 cases.**Table 3**  
Recall of advertisement on HPV vaccination, according to socio-demographics characteristics and reproductive health history.

	Recalled the advertisement on HPV vaccination			P-value
	Total N (%)	Yes N (%)	No N (%)	
Total	1200 (100.0)	303 (100.0)	897 (100.0)	
Age				
18–25	257 (21.4)	56 (18.5)	201 (22.4)	0.112
26–39	576 (48.0)	141 (46.5)	435 (48.5)	
40–49	367 (30.6)	106 (35.0)	261 (29.1)	
Education level <sup>a</sup>				
Primary school incomplete-complete/secondary incomplete	460 (38.4)	82 (27.1)	378 (42.2)	0.000
Secondary complete/tertiary incomplete	543 (45.3)	142 (46.8)	401 (44.7)	
Tertiary complete	196 (16.3)	79 (26.1)	117 (13.1)	
Marital status <sup>a</sup>				
Without partner	229 (19.1)	51 (16.8)	178 (19.8)	0.245
With partner	970 (80.9)	252 (83.2)	718 (80.2)	
Head of household				
Yes	252 (21.0)	59 (19.5)	193 (21.5)	0.450
No	948 (79.0)	244 (80.5)	704 (78.5)	
Health insurance <sup>b</sup>				
Public	452 (37.7)	85 (28.1)	367 (41.0)	0.000
Private	746 (62.3)	218 (71.9)	528 (59.0)	
Socio-economic level <sup>c</sup>				
Low	785 (65.8)	181 (59.9)	604 (67.8)	0.006
Medium	312 (26.1)	85 (28.2)	227 (25.5)	
High	96 (8.1)	36 (11.9)	60 (6.7)	
Ever used contraception methods <sup>a</sup>				
No	240 (20.0)	45 (14.8)	195 (21.8)	0.009
Yes	959 (80.0)	258 (85.2)	701 (78.2)	
Ever pregnant <sup>a</sup>				
No	220 (18.3)	57 (18.9)	163 (18.2)	0.785
Yes	979 (81.7)	245 (81.1)	734 (81.8)	
Pap smear in the last 3 years				
No (+3 years/never)	225 (18.8)	38 (12.5)	187 (20.8)	0.001
Yes	975 (81.2)	265 (87.5)	710 (79.2)	

<sup>a</sup> Missing data for 1 case.<sup>b</sup> Missing data for 2 cases.<sup>c</sup> Missing data for 7 cases.

**Table 4**

Willingness to get vaccinated among women who recalled the advertisement, according socio-demographic characteristics and reproductive health history.

	Willingness to get vaccinated			P-value
	Total N (%)	Yes N (%)	No N (%)	
Total	303 (100.0)	226 (74.6)	77 (25.4)	
Age				
18–25	56 (100.0)	40 (71.4)	16 (28.6)	0.319
26–39	141 (100.0)	111 (78.7)	30 (21.3)	
40–49	106 (100.0)	75 (70.7)	31 (29.3)	
Education level				
Primary school incomplete–compl./secondary incomplete	82 (100.0)	64 (78.0)	18 (22.0)	0.684
Secondary complete/tertiary incomplete	142 (100.0)	104 (73.2)	38 (26.8)	
Tertiary complete	79 (100.0)	58 (73.4)	21 (26.6)	
Marital status				
Without partner	51 (100.0)	34 (66.7)	17 (33.3)	0.150
With partner	252 (100.0)	192 (75.0)	60 (25.0)	
Health insurance				
Public	218 (100.0)	162 (74.3)	56 (25.7)	0.876
Private	85 (100.0)	64 (75.3)	21 (24.7)	
Socio-economic level <sup>a</sup>				
Low	181 (100.0)	139 (76.8)	42 (23.2)	0.319
Medium	85 (100.0)	58 (68.2)	27 (31.8)	
High	36 (100.0)	28 (77.8)	8 (22.2)	
Ever used contraception methods				
No	45 (100.0)	33 (73.3)	12 (26.7)	0.834
Yes	258 (100.0)	193 (74.8)	65 (25.2)	
Ever pregnant				
No	57 (100.0)	42 (73.7)	35 (26.3)	0.302
Yes	246 (100.0)	184 (74.8)	62 (25.2)	
Pap smear in the last 3 years				
No (+3 years/never)	38 (100.0)	29 (76.3)	9 (23.7)	0.803
Yes	265 (100.0)	197 (74.3)	68 (25.7)	

<sup>a</sup> Missing data for 1 case.

methods and use of Pap smears in the previous 3 years were higher among women who remembered the advertisement.

When asked whether they considered that a woman would get vaccinated after having seen or heard the advertisement, around 75% ( $n = 226$ ) answered 'Surely yes' or 'Probably yes' and around 25% ( $n = 77$ ) answered 'Surely no', 'Probably no' or 'Do not know'. Socio-demographic characteristics of the two groups are shown in Table 4: no significant differences were found among the two groups of women. When we asked these 226 women why they would get vaccinated after having seen or heard the advertisement, most ( $n = 51$ ; 22.6%) answered "Because vaccines are good for health", and ( $n = 90$ ; 39.8%) "Because the advertisement said so" (Table 5).

At the time of the survey, only six women had been vaccinated. The main reasons for non-vaccination against HPV were: "Doctor did not mention that I should get the vaccine" (24.1%), "Vaccine is too expensive" (15.7%), "I do not think the vaccine is for me" (11.0%) and "Doctor does not recommend it" (10.1%) (Table 5).

Among women who had at least one daughter aged 9–15, 45.5% ( $n = 112$ ) knew about HPV vaccine. None of these girls had been vaccinated at the time of the survey. The main reasons given for not getting their daughters vaccinated were: "Doctor does not recommend it" (16.1%), "My daughter is not sexually active" (14.3%), "I did not think that the vaccine was for my daughter" (13.4%) and "The vaccine is too expensive" (13.4%), (Table 5).

Among women who only had at least one daughter younger than 9 ( $n = 278$ ), 35.9% ( $n = 100$ ) had heard about HPV vaccination. Seventy-four percent of them answered that they would get their daughter vaccinated if they were pre-adolescents (Table 6). The reason most commonly given was "I want my daughter to be protected against cervical cancer" (64%). Main reasons for not getting their daughter vaccinated were "My daughter is not sexually active" (33.3%) and "My daughter is too young" (33.3%).

#### 4. Discussion

To our knowledge, this study is the first population-based study describing knowledge and acceptability/uptake of HPV vaccine in Argentina, before inclusion in the National Immunization Program. It provides program planners and scientists with key evidence for the development of future research and strategies attempting to assure high levels of HPV vaccine coverage, in a scenario where universal HPV vaccination is offered free of charge to girls aged 11 years since October 2011 [12].

We found that the level of knowledge about HPV vaccination was low to moderate: less than 40% of women knew the vaccine and that its use is to prevent cervical cancer or HPV infection. Similar results were reported from studies carried out in developed and developing countries [4,14–20]. Interestingly, women had little knowledge on HPV vaccination, despite the mass media campaign carried out in 2008, which was only remembered by one-third of them. This finding warrants further exploration to evaluate potential impact of different communication strategies.

Older women and those with higher levels of education had adequate knowledge about HPV vaccination. A higher knowledge of HPV vaccination was also found in women who had undergone a Pap smear screening in the previous 3 years, which might be due to information received during a gynecologic visit. Women with more knowledge about health prevention techniques are associated with its higher utilization [21–23]. Evidence shows that education raises awareness of the importance of preventive health care and, hence, the willingness to avail of it; it may also improve understanding of information, extent of communication with the health practitioner and interpretation of results [24]. Decreased utilization of HPV vaccination among low socio-economic level girls might have a negative impact on the effectiveness of HPV vaccination to reduce incidence and mortality of cervical cancer [8], as these young women have reduced access to cervical screening and,



**Table 5**Main reasons for willingness to get vaccinated, not getting vaccinated and not getting their daughter/s vaccinated.<sup>a</sup>

	Women (%)	Number
Main reason for willingness to get vaccinated <sup>b</sup>		
Because the advertisement said it so	39.8	90
Because vaccines are good for health	22.6	51
To prevent HPV	16.4	37
To prevent cervical cancer	10.6	24
To prevent cancer	7.1	16
Other	3.5	8
Total	100.0	226
Main reasons for not getting vaccinated (n = 464) <sup>c</sup>		
Doctor did not mention that I should get the vaccine	24.1	112
Vaccine is too expensive	15.7	73
Do not think the vaccine is for me	11.0	51
Doctor does not recommend it	10.1	47
The vaccine is too new	7.6	35
I am too young/old for vaccine	2.7	12
There are other methods to prevent the cervical cancer	1.9	9
Other	26.9	125
Total	100.0	464
Main reasons for not getting their daughter/s vaccinated (n = 112) <sup>d</sup>		
Doctor does not recommend it	16.1	18
My daughter is not sexually active	14.3	16
I did not think that the vaccine was for my daughter	13.4	15
Vaccine is too expensive	13.4	15
My daughter is too young	9.8	11
The vaccine is too new	8.0	9
Worried about adverse effects	1.8	2
Other	23.2	26
Total	100.0	112

<sup>a</sup> Reasons were selected from a prompted list.<sup>b</sup> Women who remembered advertisement and responded 'Surely yes' or 'Probably yes' to the question "Do you think that a woman would be vaccinated after having seen or listened to the advertisement?"<sup>c</sup> Women who had heard about HPV vaccine and did not get vaccinated.<sup>d</sup> Women who have at least one daughter 9–15 years, had heard about HPV vaccine and did not get their daughter/s vaccinated.

therefore, are at higher risk of developing the disease [25,26]. These data underscore the importance of developing specific outreach education/communication strategies, aimed at promoting HPV vaccination, especially among women from lower socio-economic levels.

**Table 6**Vaccine acceptability for daughters younger than 9 and reasons for getting/not getting their daughters vaccinated.<sup>a</sup>

	Women (%)	Number (n = 100) <sup>b</sup>
Would you get your daughter vaccinated? <sup>c</sup>		
Yes	74.0	74
No	12.0	12
No response	14.0	14
Total	100.0	100
Reason for getting their daughters vaccinated (n = 74)		
I want my daughter to be protected against cervical cancer	64.8	46
I think that vaccines are good for health	28.2	20
Others	7.0	8
Reason for not getting their daughter vaccinated (n = 12)		
My daughter is not sexually active	33.3	4
My daughter is too young	33.3	4
I do not have enough information about the vaccine	16.7	2
Others	16.7	2

<sup>a</sup> Reasons were selected from a prompted list.<sup>b</sup> Women who had at least one daughter younger than 9 and had heard about HPV vaccine.

Please cite this article in press as: Arrossi S, et al. Acceptability and uptake of HPV vaccine in Argentina before its inclusion in the immunization program: A population-based survey. Vaccine (2012), doi:10.1016/j.vaccine.2012.01.032

The measurement of willingness to get vaccinated after hearing the mass media advertisement showed that most women accepted HPV vaccination. The high willingness to get vaccinated is consistent with the fact that, in our study, most mothers of girls under 9 years who were aware of the vaccine reported that they would have their daughter vaccinated once she reached the age for vaccination. Other studies carried out in different countries and settings have shown favorable attitudes toward vaccination [19,20,27–32]. More than 70% of parents of girls between 8 and 18 years, surveyed in a National Survey in Canada indicated an intention to have their daughters receive the HPV vaccine [29]. Similar percentages were found in surveys in USA [31,33] and in UK [30]. Studies carried out in Latin American countries found similar results. A study with mothers in Cuernavaca, Mexico, reported that 83% of women said they would allow their teenage daughter to receive the vaccine [27]. A study among Peruvian women showed that for most women it was very important to get vaccinated against HPV; 90% also indicated that if HPV vaccines were available, they would get vaccinated [20].

The main reported reasons for women's willingness to get vaccinated themselves in our study were related to a positive attitude and acceptance toward vaccines, and to a positive value assigned to the message of the mass media advertisement. The National Immunization Program in Argentina has been in place for more than 5 decades, with a history of well-implemented campaigns. Coverage is high, of around 80–95% depending on the vaccine [34], which reveals a high acceptance of the general population toward vaccines. The fact that the advertisement was signed by an NGO against cancer that is an opinion leader on the subject might have inspired a sense of trust in the advertisement recommendation. When asked about reasons for the willingness to vaccinate their girls younger than 9, most mothers reported that their primary reason was cervical cancer prevention, which is consistent with results from other studies [35–37].

A very important finding from our study is the fact that, despite this high level of willingness to get vaccinated, or intention to vaccinate in future girls younger than 9, only 6 women had been vaccinated at the moment of the survey. Evidence about HPV vaccine uptake from the United States has shown that initiation among females remains low, despite pre-licensure evidence on high acceptability of the vaccine [38,39]. HPV vaccination behavior is influenced by a multiplicity of factors, including individual perceptions of benefits and barriers, health system factors, mass media and health policy, among others [40]. Interactions of these factors in specific situations would determine how reported intentions for a health behavior are translated into action. In Argentina, the very low level of uptake measured after the 2008 mass media publicity campaign, despite high levels of acceptability, is not surprising, given that the vaccine had not yet been incorporated into the National Immunization Program, the absence of official diffusion campaigns to promote the vaccine and its high cost. The most common reasons for not being vaccinated were the absence of doctors' recommendation and vaccine cost. A similar pattern of reasons behind the null vaccination uptake was found for women's daughters aged 9–15. None of these girls had been vaccinated and the most common reason given for this was that doctors had not recommended it. Vaccine cost was given as a less frequent reason, despite the fact that, at the moment of the survey, vaccine cost was between 450 and 900 dollars (average monthly family income in Argentina was 800 dollars [41]). Several studies have shown that health professionals play an important role in vaccine acceptability and uptake, with higher vaccine acceptability among parents who are being influenced by physicians' recommendations [12,42–45]. This highlights the fact that health professional advice is one of the most important factors to accept any new health care practice. Strong support given by scientific societies to introduce HPV vaccine in the National Immunization Program [46] is an important

first step to assure that health professionals receive training, education and communication tools to facilitate effective information transmission regarding the vaccine. The fact that, in the context of the controversy regarding the HPV vaccine publicity, the MoH and medical scientific societies produced public messages reinforcing the role of screening in cervical cancer prevention might have also had an effect on the level of HPV vaccine uptake following the 2008 mass media campaign.

An important strength of this study is having interviewed a population-based sample from the AMBA, where 1/3 of the total country population lives, so our findings on vaccine knowledge and uptake, and about reasons for not getting vaccinated are representative of an important portion of the Argentinean population of women. Limitations of the study include our inability to measure acceptability among women who did not remember the publicity. Compared to women who did not recall the publicity, those who did had higher socio-economic status and level of education, suggesting that the acceptability found in this study might not be representative of women from lower socio-economic groups and with less access to health services. However, evidence indicates that acceptability of HPV vaccination increases once women are given appropriate information and this irrespective of their socio-demographic status [44,47,48]. Finally, the very low level of vaccination uptake did not allow for analysis of socio-demographic differentials in vaccine uptake.

## 5. Conclusion

Our data suggest that the potential acceptability of the HPV vaccine is high in Argentina, given that there is acceptance among the professional community, that physicians recommend it, and that the vaccine is affordable. Special educational efforts must be undertaken to assure that physicians provide parents and women adequate, evidence-based information about the HPV vaccine.

## Acknowledgments

*Role of the funding:* This project research was funded by PATH, who neither had any role in the design and implementation of the project, nor a role or influence in the writing of this paper. *Conflict of interest:* Authors of this paper do not have any conflict of interest.

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