

# Knowledge, attitudes and perceptions of health professionals in relation to A/H1N1 influenza and its vaccine

Amanda López-Picado<sup>1</sup>, Antxon Apiñaniz<sup>2</sup>, Amaia Latorre Ramos<sup>1</sup>, Erika Miranda-Serrano<sup>1</sup>, Raquel Cobos<sup>1</sup>, Naiara Parraza-Díez<sup>1</sup>, Patricia Amezua<sup>1</sup>, Mónica Martínez-Cengotitabengoa<sup>3,4</sup> and Felipe Aizpuru<sup>1,5,6\*</sup>

<sup>1</sup>Araba Research Unit, Araba University Hospital, Vitoria-Gasteiz, Spain; <sup>2</sup>Araba Primary Care Unit, Vitoria-Gasteiz, Spain; <sup>3</sup>CIBERSAM, Centro de Investigación Biomédica en Red de Salud Mental, Madrid, Spain; <sup>4</sup>Department of Psychiatry, Araba University Hospital, Vitoria-Gasteiz, Spain; <sup>5</sup>CIBER de Epidemiología y Salud Pública (CIBERESP), Madrid, Spain; <sup>6</sup>Faculty of Medicine, University of the Basque Country, Vitoria-Gasteiz, Spain

**Objective:** To determine the intention of health professionals, doctors and nurses, concerning whether or not to be vaccinated against A/H1N1 influenza virus, and their perception of the severity of this pandemic compared with seasonal flu.

**Material and Methods:** A cross-sectional study was carried out based on an questionnaire e-mailed to health professionals in public healthcare centres in Vitoria between 6 and 16 November 2009; the percentage of respondents who wanted to be vaccinated and who perceived the pandemic flu to carry a high risk of death were calculated.

**Results:** A total of 115 people completed the questionnaire of whom 61.7% (n = 71) were doctors and 38.3% (n = 44) were nurses. Of these, 33.3% (n = 23) of doctors and 13.6% (n = 6) of nurses intended to be vaccinated (p = 0.019). Even among those who considered themselves to be at a high risk, 70.6% (n = 48) of doctors and 31.7% (n = 13) of nurses participating in the study (p = 0.001) planned to have the vaccination.

**Conclusions:** Most health professionals, and in particular nurses, had no intention to be vaccinated against A/H1N1 influenza virus at the beginning of the vaccination campaign.

**Keywords:** A/H1N1 influenza virus; vaccination; health professionals; doctors; nurses

Received: 4 September 2011; Revised: 25 October 2011; Accepted: 16 November 2011; Published: 11 January 2012

Many international organisations have highlighted the importance of vaccination against seasonal flu for health professionals (1–4). The recommendation is based on various factors such as the increased risk of complications associated with infection in patients in at-risk groups, the tendency to go to work despite flu symptoms, and the high rates of transmission among colleagues. All these elements translate to an increase in costs and deaths.

In fact, it has been demonstrated that the vaccination of health professionals is associated with a decrease in the number of deaths of patients attended at home and of patients with high-risk medical conditions (5). Despite several studies having demonstrated the multiple advantages of vaccination, health professionals are not

keen on being vaccinated: it has been estimated that overall only between 40 and 50% of health professionals are vaccinated against the seasonal flu virus (6, 7), and these rates are even lower among nurses (8–10).

Many reasons have been put forward for not being vaccinated: fear of adverse reactions, underestimation of severity of the flu epidemic, lack of time and doubts concerning safety, among others (11–14). Despite this, it seems that among health professionals who are better informed and know the risk factors more tend to accept the vaccination, so a deeper understanding of the vaccine may help to increase willingness to be vaccinated (13–17).

In 2009, the seasonal flu vaccination campaign was preceded by that of the A/H1N1 flu virus. Since the

outset, the A/H1N1 virus has raised great concern in society, given that it is highly infectious, more so than the seasonal flu virus (18) and that the prevalence is higher among children (19).

Given these factors, vaccination against this type of virus is particularly important. In this context, it is essential to remember that any preventive measures, including vaccines, are ineffective without the collaboration of the population and health professionals (20–23). Adherence to recommendations of this sort is determined by perception of the level of danger (5), and of the effectiveness of the measures (21, 24). In short, the perception of danger and the understanding of health professionals of the A/H1N1 flu virus may directly affect acceptance of and adherence to these measures and influence the perception of the general population (25, 26).

For these reasons, the aim of this study was to determine the intention to be vaccinated against A/H1N1 flu virus among health professionals in relation to levels of understanding, attitudes and perception of risk just before the vaccination campaign at the peak of the epidemic.

## Materials and methods

An observational cross-sectional study was carried out among health professionals of the Basque Health System in Vitoria-Gasteiz.

Data collection started on 6 November, coinciding with the peak of the A/H1N1 virus epidemic in the Basque Country, and ended on 16 November, when the vaccination campaign was launched in our autonomous region, despite the fact that the expected sample size had not been reached.

The questionnaire was sent by email to doctors ( $n = 900$ ) and nurses ( $n = 1,326$ ) of the acute care public hospitals of Vitoria-Gasteiz (Txagorritxu and Santiago) and primary care health centres in Araba. They were given the option of answering electronically or by post, sending the questionnaire to the Research Unit, by internal mail within the Basque Health Service/Osaki-detza.

The data collected in the survey were entered into a dedicated computer database created using Microsoft Access software.

## Study variables

A questionnaire based on that used by Lau et al. (20) was produced consisting of 28 questions that gather information concerning views on vaccination against A/H1N1 virus and the perception of risk (Appendix 1).

Questions were asked to assess the attitude of professionals towards vaccination against A/H1N1 flu virus both if it were free of charge and if it had a cost of €10. There were also questions concerning the safety and

effectiveness of the A/H1N1 flu vaccine, and research undertaken to produce the vaccine. The response categories were 'yes', 'no', and 'don't know/no opinion', the latter leading to classification as undecided.

Lastly, data related to understanding of the routes of transmission, the perception of risk associated with the virus, and the comparison of A/H1N1 flu with seasonal virus were collected in the final section of the questionnaire.

## Analysis of the results

Descriptive statistics were calculated for the main characteristics of the sample. The main outcome was assessed by calculating the percentage of doctors and nurses who had the intention to be vaccinated against the A/H1N1 flu virus, compared with those who did not intend to be vaccinated, in the cases of the vaccine being free and of having to pay for it (€10). Any association between intention to vaccinate and sociodemographic variables including age, sex, level of education, civil status, employment status and understanding of the routes of transmission was explored using the Chi square test and  $p$  for linear trend for ordinal variables. In addition, the intention to be vaccinated was calculated as a function of prior behaviour, namely, whether or not they had previously been vaccinated against the seasonal flu virus. The analysis of the main variables (intention to vaccinate against the seasonal and A/H1N1 flu viruses, having previously been vaccinated against seasonal flu, perception of risk, and doubts concerning the effectiveness and safety of the vaccine) were adjusted for age and sex. We considered a level of significance of  $\alpha = 0.05$ . Statistical analysis was carried out using the Statistical Package for the Social Science (SPSS, version 16) for Windows.

## Ethical approval

The study was approved by the Clinical Research Ethics Committees of Txagorritxu and Santiago Hospitals.

## Results

### General characteristics

Of the 2,226 emails sent (900 to doctors and 1,326 to nurses), 115 questionnaires were returned completed, of which 71 (61.7%) and 44 (38.3%) were received from doctors and nurses, respectively. The sociodemographic characteristics of the two groups are shown in Table 1. Overall, 64.3% ( $n = 74$ ) of the sample had been vaccinated against the seasonal flu at some stage. This percentage was higher ( $p = 0.018$ ) among doctors (71.8%,  $n = 51$ ) than nurses (52.3%,  $n = 23$ ).

**Table 1.** Sociodemographic characteristics

<i>n</i> = 115	Doctors ( <i>n</i> = 71)	Nurses ( <i>n</i> = 44)
<b>Sex</b>		
Male	29 (40.8%)	6 (13.6%)
Female	42 (59.2%)	38 (86.4%)
<b>Age</b>		
Media ± SD	42.5 ± 9.9	43.3 ± 10.1
≤30 years	10 (15.4%)	6 (14.3%)
30–65 years	55 (84.6%)	36 (85.7%)
<b>Marital status</b>		
Single	17 (25.4%)	13 (29.5%)
Married/couple	50 (74.6%)	31 (70.5%)

### Attitude towards vaccination against A/H1N1 influenza virus

A total of 33.3% (*n* = 23) of doctors had the intention to be vaccinated against the A/H1N1 flu virus, compared with 13.6% (*n* = 6) of nurses (*p* = 0.023). These percentages were even lower if the vaccine was not free (€10), both among the doctors (27.5%; *n* = 19) and the nurses (6.8%; *n* = 3).

Among those who considered themselves to be at high risk of contracting A/H1N1 flu, 70.6% (*n* = 48) and 31.7% (*n* = 13) of doctors and nurses, respectively, indicated that they would be vaccinated. There was a statistically significant difference between the two groups, doctors and nurses (*p* = 0.002).

Among the nurses, no significant difference was detected in intention to be vaccinated between those who had (*n* = 4; 11.4%) and had not had the seasonal flu jab previously (*n* = 5; 11.4%, *p* = 0.166). Likewise, intention to be vaccinated was not significantly higher among doctors who had been previously been vaccinated at least once against the seasonal flu virus (*n* = 51), 41.2% (*n* = 21, *p* = 0.126) expressing an intention to receive the H1N1 vaccine.

### Acceptance of the A/H1N1 influenza virus vaccine and perception of its effectiveness

A total of 69.8% (*n* = 30) of the nurses who participated objected to being vaccinated, while this figure was 48.5% (*n* = 33) among the doctors (*p* = 0.04). Significant differences were also found between the groups with regards to the perception of effectiveness of the vaccine. Among respondents, 63.3% (*n* = 38) of the doctors considered that the vaccine was effective, compared with 35.1% (*n* = 13) of the nurses (*p* = 0.044). Even among healthcare workers who trusted in the effectiveness of the vaccine (*n* = 51), more than half did not intend to be vaccinated (*n* = 26; 51%).

### Understanding of the A/H1N1 pandemic and routes of transmission

With regards to the routes of transmission, 74.6% (*n* = 53) of doctors and 75% (*n* = 33) of nurses were properly informed. Among these, 65.1% had obtained the information through colleagues, while 20.9% cited the media, and the remaining respondents had acquired the knowledge from other sources.

### Perception of risk of infection and severity of the flu

Doctors had a higher perception of risk of infection by A/H1N1 influenza virus than nurses. They considered that they, and their own families and the general population, were at high risk of becoming infected (*p* < 0.05). Data regarding this section of the questionnaire are shown in Table 2.

With regards to mortality, 68.1% (*n* = 47) of doctors and 79.1% (*n* = 34) of nurses thought that, in 2009, one to 10 people were going to die due to this type of flu in the local area (Vitoria-Gasteiz). On the other hand, 14.5% (*n* = 10) and 16.3% (*n* = 7) of doctors and nurses, respectively, thought that nobody was going to die, whereas 14.5% (*n* = 10) of doctors and 4.7% (*n* = 2) of nurses thought that between 10 and 50 individuals (*p* = 0.247) would die.

A total of 41.4% (*n* = 29) of doctors and 45.5% (*n* = 20) of nurses believed that the harm caused by the A/H1N1 flu virus was similar to that of the seasonal influenza virus (*p* = 0.015), while 43.7% (*n* = 31) of doctors and 59.1% (*n* = 26) of nurses thought that A/H1N1 flu would have a much lower rate of mortality than seasonal flu (*p* = 0.17).

### Discussion

The primary objective of this study was to determine the intention of health professionals to be vaccinated as well as their perception of the severity of the infection caused by the A/H1N1 influenza virus, as investigated by other researchers (13, 15, 16, 27–29), in relation to this and other pandemics associated with various subtypes of the influenza virus. A total of 2,226 questionnaires were sent of which just 115 were returned completed (5.2%). This overall percentage is lower than that achieved in other studies (12, 15, 25, 26) and in other projects carried out in

**Table 2.** Do you think there is a high risk of suffering from swine flu

		Yes (%)	No (%)	<i>p</i>
You?	Doctors	54 (78.3)	15 (21.7)	0.013
	Nurses	26 (59.1)	18 (40.9)	
Own family?	Doctors	58 (84.1)	11 (15.9)	0.01
	Nurses	28 (63.6)	16 (36.4)	
General population?	Doctors	56 (81.2)	13 (18.8)	0.031
	Nurses	25 (56.8)	19 (43.2)	

the same area by this research team (23), though the rate of response from nursing staff was similar to that obtained by other researchers (2, 3). The overall low rate of response may be due to the short window of time during which questionnaires were accepted, given the importance of it being completed before the vaccination campaign began.

The overall percentage of those vaccinated against the seasonal flu at least once before was higher than that observed in other studies (30), though similar values to those reported elsewhere were found for nurses (31), who, in general, are less keen to be vaccinated (5, 6). The overall higher rate may be due to the fact that the vaccine is offered for free in the centres themselves, which facilitates access and hence tends to increase the number of staff vaccinated (13). Nevertheless, various authors have suggested that easy access to vaccines is not sufficient and that it should be combined with other measures such as educational programmes and economic incentives to achieve high vaccination rates (31, 32). In our study, we did not focus on assessing the effect of incentives but we did observe that having to pay for vaccines considerably decreased the intention to vaccinate in both groups, particularly in the case of nurses. Some authors have recommended the introduction of health education campaigns especially focused on this professional group (33, 34), but several studies suggest that such programmes do not achieve higher rates of vaccine acceptance (35–37).

On the other hand, the intention to vaccinate against A/H1N1 influenza virus among respondents is similar (25.7%) to other studies in Spain (38), and is within the wide range reported to date from studies conducted elsewhere (9, 20, 26, 39, 40) (11–67%). A greater willingness to vaccinate was also detected among those who had been vaccinated before against seasonal flu, in agreement with what is found in the literature (13, 26, 41).

In contrast to findings of other researchers (16), we did not find a higher tendency to be vaccinated among those who were properly informed. This might be attributable to the criteria followed for determining whether respondents were ‘properly informed’ and the personal perception of individual health professionals, among other factors.

The main reported arguments against vaccination are the fear of the occurrence of adverse reactions (13) and the lack of effectiveness (11, 20). In relation to this, several studies have found differences between the two groups surveyed, namely that for nurses the main obstacle to being vaccinated tends to be a fear of adverse reactions (13), whereas for doctors it is the lack of effectiveness (11, 17).

In our study, most respondents had objections to being vaccinated and did not trust in the effectiveness of the vaccine. This is in agreement with the results obtained with regards to this pandemic in the general population in our geographical area (23, 38), but very different from

the findings of a study carried out by Lau et al. (20), in a different cultural setting, Hong Kong, in which 73% of the respondents from the general population had no objections to being vaccinated.

In our study, the response was stronger among the nurses, who in most cases objected to being vaccinated and believed that there had not been sufficient research on the vaccine. This, together with the fact that many of them questioned the effectiveness of the vaccine, leads us to conclude that, in our sample, the main reasons for not being vaccinated are the perception of lack of safety and of effectiveness of the vaccine, which have also been cited by other researchers (11, 13).

According to our results, however, these are not the only factors that can affect the levels of vaccination: specifically, a lower rate of intention to vaccinate was detected among the health personnel who perceived the pandemic as a low-risk situation, in agreement with what has been observed in other studies (11, 23, 35). When the data are broken down, we note that again it is the nurses who report the lowest rates of intention to be vaccinated. This is supported by the fact that quite a few of the respondents considered that while they and their families were at risk of being infected, they believed that the mortality associated with the A/H1N1 virus was low.

Despite numerous studies having demonstrated a greater risk of contracting A/H1N1 flu in young people (39) and a greater risk of severe symptoms in infants and older individuals (40, 41), among the healthcare workers surveyed such findings did not seem to increase perception of risk or translate to a greater intention to vaccinate against the pandemic. Indeed, we observed no significant variations in the opinion of the professionals surveyed by age or by sex, but rather their intentions were affected by personal perception of the risks (11, 23, 35) and their confidence in the effectiveness of the vaccine (11, 17).

In short, it is essential to determine the barriers to being vaccinated among health professionals, since this low willingness not only has a negative impact on the level of absenteeism, and hence on the healthcare provided (16, 29, 31), but also on the rate of transmission of the disease between health professionals and patients, (13, 32) and this, without any doubt, is the most important consequence.

Moreover, the effect of the beliefs of health professionals, in particular those of doctors (38), on patients regarding certain issues should not be underestimated, as patients who are advised by their doctor to be vaccinated tend to follow this advice. Hence, any measure to improve the level of understanding concerning this and any other pandemic among health professionals translates to a greater awareness among the general population and, correspondingly, a higher rate of vaccination (38).

The limitations of the study include the short window of time available for sending and receiving the questionnaires

given the imminent start of the vaccination campaign, which led to a low rate of response to the survey. On the other hand, we considered that the most important issue was to avoid the bias of surveying individuals who had already been vaccinated. Another source of bias was selection bias among health professionals who opted to complete the questionnaire; it is plausible that quite a few of them had stronger opinions with respect to this pandemic than their colleagues who did not respond. Taking into account that properly informed health professionals are more likely to be vaccinated, it may be the case that our data are an over-estimation of the intention to vaccinate among health professionals, and that in fact, the rate of vaccination would have been even lower than that predicted by this study.

To conclude, this study focuses on the level of acceptance of the vaccine against A/H1N1 influenza virus among health professionals in our region. Although the results are limited by the low rate of response obtained, they provide information with regards the perception of this pandemic among health professionals that could contribute to the design and implementation of measures to improve strategies used by health organisations, which is of great importance given the high level of rejection of the vaccine, especially among nurses. Such measures should help increase the understanding and acceptance of vaccines among health professionals, which is key for achieving higher rates of vaccination among the general population in this and future pandemics.

## Acknowledgements

We would like to thank all the participants, the management of the Araba University Hospital and of the Araba Health region, and our IT services for their collaboration in this research.

## Conflict of interest and funding

Authors state that they have no conflict of interest in relation to this manuscript. The authors have received no funding from external sources.

## References

- Centers for disease Control and Prevention. Prevention and control of influenza: Recommendations of the Advisory Committee on Immunization Practices (ACIP), 2008. *MMWR Recomm Rep.* 2008;57(RR-7):1–60.
- Center for Disease and Prevention. Prevention and control of Influenza: Recommendations of the Advisory Committee on Immunization Practice (ACIP), 2008. *MMWR Recomm Rep.* 2006;55(RR-2):1–16.
- Anonymous. Organizational position statements on vaccination of healthcare workers [downloaded 2009 February 18]. Available from: [http://www.preventinfluenza.org/profs\\_workers.asp](http://www.preventinfluenza.org/profs_workers.asp).
- National Advisory Committee on Immunization. Statement on influenza vaccination for the 2008–2009 season. An Advisory Committee statement. *Can Commun Dis Rep.* 2008;34:1–46.
- Nichol KL. Efficacy and effectiveness of influenza vaccination. *Vaccine.* 2008;26 Suppl 4:D17–22.
- Walker FJ, Singleton JA, Lu P, Wooten KG, Strikas RA. Influenza vaccination of healthcare workers in the United States, 1989–2002. *Infect Control Hosp Epidemiol.* 2006;27:257–65.
- Lemaitre M, Meret T, Rothan-Tondeur M, Belmin J, Lejonc JL, Luquel L. Effect of influenza vaccination of nursing home staff on mortality of residents: A cluster-randomized trial. *J Am Geriatr Soc.* 2009;57:1580–6.
- Martinello RA, Jones L, Topal JE. Correlation between healthcare workers' knowledge of influenza vaccine and vaccine receipt. *Infect Control Hosp Epidemiol.* 2003;24:845–7.
- Christini AB, Shutt KA, Byers KE. Influenza vaccination rates and motivators among healthcare workers groups. *Infect Control Hosp Epidemiol.* 2007;28:171–7.
- Wong SYS, Wong ELY, Chor J, Kung K, Can PKS, Wong C. Willingness to accept H1N1 pandemic influenza vaccine: A cross-sectional study of Hong Kong community nurses. *BMC Infect Dis.* 2010;10:316.
- Rodríguez Coronado V, García de Blas F, Reverte Asuero C, Herraiz Cristóbal R, Álvarez Villalba M, del Cura González MI. Motivos de los trabajadores sanitarios de atención primaria para no vacunarse contra la gripe. *Vacunas.* 2009;10:37–41.
- Douville LE, Myers A, Jackson MA, Lantos JD. Health care worker knowledge, attitudes, and beliefs regarding mandatory influenza vaccination. *Arch Pediatr Adolesc Med.* 2010;164:33–7.
- Esposito S, Bosis S, Pelucchi C, Tremolati E, Sabatini C, Semino M, et al. Influenza vaccination among healthcare workers in multidisciplinary University hospital in Italy. *BMC Public Health.* 2008;8:422.
- Wicker S, Rabenau HF, Doerr HW, Allwinn R. Influenza vaccination compliance among health care workers in German University Hospital. *Infection.* 2009;37:197–202.
- Qureshi AM, Hughes NJM, Murphy E, Primrose WR. Factors influencing uptake of influenza vaccination among hospital-based health care workers. *Occup Med.* 2004;54:197–201.
- Clark S, Cowan A, Wortley P. Influenza vaccination attitudes and practices among US registered nurses. *Am J Infect Control.* 2009;37:551–6.
- Sypsa V, Livanios T, Psychogiou M, Malliori M, Tsiodras S, Nikolakopoulos I, et al. Public perceptions in relation to intention to receive pandemic influenza vaccination in a random population sample: Evidence from a cross-sectional telephone survey. *Euro Surveill.* 2009;14(49):pii =1943.
- Fraser C, Donnelly CA, Cauchemez S, Hanage WP, Van Kerkhove MD, Hollingsworth TD, et al. Pandemic potential of a strain of influenza A (H1N1): early findings. *Science.* 2009;324:1557–61.
- MSNBC. Best way to stop flu: Vaccinate schoolchildren. 2009 [downloaded 2009 November 13]. Available from: [http://www.msnbc.msn.com/id/31269066/ns/health-swine\\_flu](http://www.msnbc.msn.com/id/31269066/ns/health-swine_flu).
- Lau J, Yeung N, Choi KC, Cheng M, Tsui HY, Griffiths S. Acceptability of A/H1N1 vaccination during pandemic phase of influenza A/H1N1 in Hong Kong: Population based cross sectional survey. *BMJ.* 2009;339:b4164.
- Barr M, Rápale B, Taylor M, Stevens G, Jorm L, Giffin M, et al. Pandemic influenza in Australia: Using telephone survey to measure perceptions of threat and willingness to comply. *BMC Infect Dis.* 2008;8:117.
- Harris KM, Maurer J, Kellermann AL. Influenza vaccine-safe, effective, and mistrusted. *N Eng J Med.* 2010;363:2183–5.
- Apiñaniz Fernandez de Larrinoa A, Lopez Picado A, Miranda Serrano E, Latorre Ramos A, Parraza Díez N, Cobos Campos R. Estudio transversal basado en la población sobre la aceptabilidad de la vacuna y la percepción de la gravedad de

- la gripe A/H1N1: Opinión de la población general y de los profesionales sanitarios. *Gac Sanit.* 2010;24:314–20.
24. Leppin A, Aro AR. Risk perceptions related to SARS and avian influenza: Theoretical foundations of current empirical research. *Int J Behav Med.* 2009;16:7–29.
  25. Poehling KA, Speroff TT, Dittus R, Griffin MR, Hickson GB, Edwards KM. Predictors of influenza virus vaccination status in hospitalized children. *Paediatrics.* 2004;114(2):e16–22.
  26. Isaacson N, Roemheld-Hamm B, Crosson JC, Diccio-Bloom B, Winston CA. Organizational culture influences health care workers' influenza immunization behaviour. *Fam Med.* 2009;41(3):202–7.
  27. Chor J, Ngai K, Goggins WB, Wong M, Wong S, Lee N, et al. Willingness of Hong Kong healthcare workers to accept pre-pandemic influenza vaccination at different WHO alert levels: Two questionnaire surveys. *BMJ.* 2009;339:3391.
  28. Seale H, Leask J, Po K, MacIntyre CR. Will they just pack up and leave? – attitudes and intended behaviour of hospital health care workers during influenza pandemic. *BMC Health Serv Res.* 2009;9:30.
  29. Nowalk MP, Lin CJ, Zimmerman RK, Fox DE, Raymund M, Tanis MD, et al. Self-reported influenza vaccination rates among health care workers in a large health system. *Am J Infect Control.* 2008;36:574–81.
  30. Wicker S, Rabenau HF, Doerr HW, Allwinn R. Influenza vaccination compliance among health care workers in German University Hospital. *Infection.* 2009;37:197–202.
  31. Lindley MC, Horlick GA, Shefer AM, Shaw FE, Gorji M. Assessing state immunization requirements for healthcare workers and patients. *Am J Prev Med.* 2007;32:459–65.
  32. Canning HS. Health care workers beliefs about influenza vaccine and reasons for non-vaccination—a cross sectional survey. *J Clin Nurs.* 2005;14:922–5.
  33. To KW, Lee S, Chan TO, Lee SS. Exploring determinants of acceptance of the pandemic influenza A (H1N1) 2009 vaccination in nurse. *Am J Infect Control.* 2010;38:623–30.
  34. Ofstead CL, Tucker SJ, Beebe TJ, Poland GA. Influenza vaccination among registered nurses: Information receipt, knowledge, and decision-making at an institution with a multifaceted educational program. *Infect Control Hosp Epidemiol.* 2008;29:99–106.
  35. O'Rourke C, Bourke W, Bedford D, Howell F. Uptake of influenza vaccine by healthcare workers in an acute hospital in Ireland. *Ir Med J.* 2003;96:207–9.
  36. Dey P, Halder S, Collins S, Benons L, Woodman C. Promoting uptake of influenza vaccination among health care workers: A randomized controlled trial. *J Public Health Med.* 2001;23:346–8.
  37. Lam PP, Chambers LW, Pierrynowski MacDougall DM, McCarthy AE. Seasonal influenza vaccination campaigns for health care personnel: Systematic review. *CMAJ.* 2010;182:e542–8.
  38. Hernandez-Garcia I. Aceptabilidad de la vacuna frente al nuevo virus influenza A(H1N1) en pacientes hospitalizados. *Med Cli (Barc).* 2010;136:694–5.
  39. Reichert T, Chowell G, Nishiura H, Christensen RA, McCullers JA. Does glycosylation as a modifier of Original Antigenic Sin explain the case age distribution and unusual toxicity in pandemic novel H1N1 influenza? *BMC Infect Dis.* 2010;10:5.
  40. Presanis AM, De Angelis D, The New York City Swine Flu Investigation Team, Hagy A, Reed C, Riley S, et al. The severity of pandemic H1N1 influenza in the United States, from April to July 2009: A Bayesian analysis. *PLoS Med.* 2009;6(12):e1000207.
  41. Chowell G, Echevarría-Zuno S, Viboud C, Simonsen L, Tamerius J, Miller MA, et al. Characterizing the epidemiology of the 2009 influenza A/H1N1 pandemic in Mexico. *PLoS Med.* 2011;8(5):e1000436.

---

**\*Felipe Aizpuru**

Araba Research Unit  
Araba University Hospital  
C/ Jose Atxotegui s/n  
01013 CP Vitoria-Gasteiz (Álava)  
Spain  
Tel: +34 945007413  
Fax: +34 945007336  
Email: Felipeesteban.Aizpurubarandiaran@osakidetza.net

Dear Colleagues,

The Research Unit of Txagorritxu Hospital and Research Commission for the Health Region of Araba are studying views concerning A/H1N1 influenza. We will be most grateful if you take part.

The information collected will remain anonymous. You can return the completed questionnaire by e-mail (to [unidadinvestigacion.hospitaltxagorritxu@osakidetza.net](mailto:unidadinvestigacion.hospitaltxagorritxu@osakidetza.net)) or through the internal mail, addressing it to the secretary of the Txagorritxu Hospital's Research Unit.

## QUESTIONNAIRE

### a) General questions

1. Sex
  1. Woman
  2. Man
2. Year of birth
3. Profession
  1. Doctor
  2. Nurse
  3. Other
4. Civil status
  1. Single
  2. Married/With partner
5. What is your employment status?
  1. Permanent contract
  2. Temporary contract
  3. Casual contract
6. Have you ever received a seasonal flu jab?
  1. Yes
  2. No
7. What has been your principal source of information on A(H1N1) flu?
  1. Healthcare colleagues
  2. The media
  3. Other

### b) Hypothetical situations

8. If it were free, would you have the A(H1N1) flu jab?
  1. Yes
  2. No
9. And would have the jab if it cost €10?
  1. Yes
  2. No

10. Do you know which are the at-risk groups with respect to A(H1N1) flu?
  1. Yes
  2. No
11. If you were in one of the at-risk groups, would you be vaccinated?
  1. Yes
  2. No
12. Do you think that A(H1N1) flu is spread by coughs and sneezes?
  1. Yes
  2. No
13. Do you think that A(H1N1) flu can be spread by physical contact (e.g., shaking hands)?
  1. Yes
  2. No
14. Do you think that A(H1N1) flu can be spread by contact with contaminated surfaces (e.g., by touching a door handle)?
  1. Yes
  2. No

### c) Your perception of the severity of the A(H1N1) flu

15. What percentage of the general population do you think will get A(H1N1) flu?
  1. <1%
  2. 1–5%
  3. >5%
16. Do you think that A(H1N1) flu could have severe and irreversible effects on the health of the general population?
  1. Yes
  2. No
17. How many deaths do you think the A(H1N1) flu will cause in our region (Vitoria-Gasteiz) in 2009?
  1. None
  2. 1–10
  3. 11–50
  4. >50
18. Do you think that some people have had A(H1N1) flu and have not realised?
  1. Yes
  2. No
19. Do you think that this illness will affect most of the population in our region (Vitoria-Gasteiz)?
  1. Yes
  2. No

**d) Perception of risk**

20. Do you think that you are at high risk of getting A(H1N1) flu?  
1. Yes  
2. No
21. Do you think that there is a high risk that someone in your family will get A(H1N1) flu?  
1. Yes  
2. No
22. Do you think that there is a high risk that members of the general population will get A(H1N1) flu?  
1. Yes  
2. No

**e) Comparison of A(H1N1) flu with seasonal flu**

23. How many deaths do you think A(H1N1) flu will cause compared to normal (seasonal) flu? That is, we are asking you to rate how the mortality associated with A(H1N1) flu compares to that of seasonal flu.  
1. Many fewer  
2. Slightly fewer  
3. The same  
4. Slightly more  
5. Many more
24. How many people do you think will be infected compared to normal (seasonal) flu? (That is, how do you think the rate of infection will compare between A(H1N1) flu and seasonal flu?)

1. Many fewer  
2. Slightly fewer  
3. The same  
4. Slightly more  
5. Many more

25. How much harm do you think the A(H1N1) flu will cause compared to seasonal flu? (What level of damage will be caused to the body by A(H1N1) flu in relation to seasonal flu?)  
1. Much less  
2. Slightly less  
3. The same  
4. Slightly more  
5. Much more
26. Do you have any objections to receiving the A(H1N1) flu vaccine?  
1. Yes  
2. No
27. Do you think that the vaccine is effective at preventing A(H1N1) flu?  
1. Yes  
2. No
28. Do you think that there has been sufficient research into the vaccine? (In your opinion, have there been enough studies/clinical trials/research to demonstrate the effectiveness of the vaccine?)  
1. Yes  
2. No

THANK-YOU VERY MUCH FOR YOUR HELP