KNOWLEDGE, ATTITUDES AND PRACTICES REGARDING INFLUENZA PREVENTION AND CONTROL MEASURES AMONG HISPANICS IN SAN DIEGO COUNTY – 2006

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Background: Influenza vaccination is the most effective method to avoid influenza virus infection and its potential serious complications; however, influenza vaccine is underutilized especially among minority groups.

Objectives: We assessed the knowledge, attitudes, and practices (KAP) regarding influenza prevention and control measures among Hispanics in San Diego County.

Methods: We used a multistage cluster sampling scheme to administer an in-person, door-to-door KAP survey to 226 Hispanics aged ≥18 years in three regions of San Diego County during July–August 2006.

Results: Hispanics in the three regions sampled for this survey varied widely by age, country of birth, years living in the United States, number of border crossings in previous month, and number of people in household. Awareness of the influenza vaccine was nearly 90% among survey respondents. The percentage of Hispanic males and females aged 50–64 years who received an influenza vaccination in the previous 12 months was 7.7% and 23.5%, respectively, and the percentage of Hispanic males and females aged ≥65 years who received an influenza vaccination in the previous 12 months was 33.3% and 59.1%, respectively.

Conclusions: This survey showed high awareness of the influenza vaccine among Hispanics in San Diego County but relatively low vaccination rates among respondents aged ≥50 years, a group targeted for influenza vaccination. Differences in awareness and vaccination rates between Hispanic males and females across all age groups indicate that educational outreach efforts should specifically target Hispanic men. (*Ethn Dis.* 2009;19:377–383)

Key Words: Hispanic, Latino, Influenza, Immigrant, Vaccination, Knowledge, Awareness, Practices

INTRODUCTION

Each year, on average, more than 200,000 people are hospitalized and roughly 36,000 people die due to complications from influenza infection.[1,2] Influenza viruses can infect persons of any age, but the highest rates of serious illness and death are among persons aged ≥65 years, children aged <2 years, and persons of any age who have medical conditions, including pregnancy, that put them at a greater risk for complications from influenza.[3–6] Influenza vaccination is the most effective method to avoid influenza virus infection and its potential serious complications.[7] However, influenza vaccine is underutilized especially among minority groups. The 2006 National Health Interview Survey showed that 44.8% of Hispanics aged ≥65 years received an influenza vaccination in the preceding 12 months compared with 67.2% of non-Hispanic white persons.[8] In addition to the influenza vaccination, the Centers for Disease Control and Prevention (CDC) recommends good health habits, such as covering one's cough and frequent hand washing to decrease the risk of spreading respiratory illness.[9] These measures, while not proven to prevent the transmission of influenza among humans, may be important means to reduce the transmission of pandemic influenza infection in the absence of widely available vaccine and influenza antiviral medications.

The 2006 National Health Interview Survey showed that 44.8% of Hispanics aged ≥65 years received an influenza vaccination in the preceding 12 months compared with 67.2% of non-Hispanic white persons.[8]

According to the US Census Bureau's 2006 American Community Survey, San Diego County is home to over 885,000 Hispanics, of whom 40% are foreign-born.[10] Although influenza occurs in all racial/ethnic groups, Hispanics are potentially at increased risk of infection due to language and cultural barriers to obtaining influenza vaccine and possibly other information that may lead to behavior changes and decreased transmission of respiratory illness. In preparation for an influenza pandemic and as a means to decrease the health impact of seasonal influenza, the increased vaccination of Hispanic persons targeted for influenza vaccination is needed. However, little is known about the KAP regarding influenza among the Hispanic population in San Diego County.

A cross-sectional knowledge, attitudes, and practices (KAP) survey using a multistage cluster sampling strategy was administered to 226 Hispanic men and women aged 18 years or older in

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San Diego County, California, during July and August 2006. The objective of the KAP survey was to assess and identify gaps in the knowledge, attitudes, and practices regarding influenza prevention and control measures among Hispanics in San Diego County. In addition, with recent concerns about H5N1 avian influenza and its possible mutation to a virus strain capable of human-to-human transmission, we assessed compliance with potential interventions to mitigate the impact of a possible influenza pandemic.

METHODS

Survey Instrument

Questions about influenza prevention and control measures were part of a larger survey assessing KAP among Hispanics in San Diego County regarding several health-related issues ranging from influenza to lead poisoning. Questions for the survey were based on questions used in previous studies and border regional focus groups, with modifications based on input from local experts and results from pilot testing.[11–13] Project staff pilot tested the questionnaire to 10 adult Hispanic patients visiting the County of San Diego Health Department for reasons other than influenza vaccination. Spanish translation was conducted separately by two bilingual CDC staff members. Questions to assess knowledge about influenza were: 1) Are you aware there is a vaccine for the flu? 2) Did you ever see or hear anything that told you how to prevent the flu, other than getting a flu vaccination? 3) What did you see or hear? Responses to what was seen or heard about preventing influenza, besides the vaccination, included hand washing, covering coughs and sneezes, getting enough sleep, eating plenty of fruits and vegetables, staying home when ill, and other open-ended responses. Influenza practices were measured by asking respondents: 1) Have you ever received a flu vaccination? 2) Have you received a flu vaccination in the previous 12 months? Interviewers asked respondents two possible questions regarding likely adherence to two pandemic influenza control measures, including travel restrictions and home isolation when ill.

Interviewers collected sociodemographic variables including age, education, sex, country of birth, years living in the United States (among foreign-born respondents), number of US-Mexico border crossings in the previous 30 days, and number of adults and children aged 18 years or younger living in the household. Hispanic ethnicity was self-assessed by respondents.

Data Collection

A multistage cluster sampling scheme was used to survey Hispanics aged ≥18 years in three regions of San Diego County.[14–16] First, of the 605 census tracts in the county, 29 with more than 75% Hispanic population were identified. Next, 12 of these census tracts were identified in three regions of San Diego County: Region 1 in northern San Diego County (Vista; 4 contiguous census tracts), Region 2 in central San Diego County (Logan Heights; 3 contiguous census tracts), and Region 3 in southern San Diego County (San Ysidro; 5 contiguous census tracts) along the US-Mexico international border. The 12 census tracts were chosen due to high percent Hispanic population and location in the county. The regions are not formally defined but rather chosen to ensure that Hispanics throughout the county are included in the survey. Contiguous census blocks were then grouped to create 111 clusters eligible for sampling in the next stage. A minimum of 40 households per cluster was chosen to ensure that a sufficient number of Hispanic households were sampled. Next, 30 clusters with high probabilities of Hispanic households being proportional to the size of the total number of households were selected. Finally, systematic sampling with a random start was used at the cluster level to identify 14 households in each of the 30 clusters. Beginning at the northwest corner of the assigned block, trained bilingual interviewers proceeded clockwise and approached households selected according to the sampling interval.

The sampling interval was the total number of households in a cluster divided by 14. The goal of the systematic sampling stage was to identify 10 eligible Hispanic households in each cluster. Therefore, 14 households per cluster were approached to allow for non-Hispanic households in the sampling frame. Interviewers asked to speak to a Hispanic member of the household aged 18 years or older who was the most knowledgeable about the household's health. Interviewers assessed the individual's preferred language, briefly described the survey, and read a verbal informed consent form to ensure the respondent's agreement to participate in the survey. Once verbal informed consent was obtained, the interviewers conducted an approximately 15-minute survey at the respondent's door.

The surveys were administered by trained interviewers on three consecutive weekends in July and August 2006. One weekend was devoted to each of the three regions in San Diego County. The interviewers approached all selected households on their route on Saturday and revisited homes with no answer on Sunday. This protocol was reviewed by CDC's Institutional Review Board and received exemption from human subjects regulation on the grounds that the survey collected nonidentifiable and nonsensitive information from adults.

Statistical Analysis

Data were entered from paper-based surveys into a database and analyzed with STATA.[17] Point estimates and 95% confidence intervals were generated to describe KAP regarding influenza control measures among the respondents. For

Table 1. Demographic characteristics of survey respondents, San Diego County, 2006

	Overall (*N*=226)	Region			$P^{\dagger,\ddagger}$
		Region 1* (*n*=41)	Region 2* (*n*=54)	Region 3* (*n*=131)	
Age (years); % (*n*)					
18–49	73.0 (165)	95.1 (39)	70.4 (38)	67.2 (88)	.006
50–64	13.3 (30)	4.9 (2)	14.8 (8)	15.3 (20)	.206
≥ 65	13.7 (31)	0.0 (0)	14.8 (8)	17.6 (23)	.190
Education; % (*n*)					.206
≤ 12 years	85.5 (188)	87.2 (34)	90.7 (49)	82.7 (105)	
> 12 years	14.5 (32)	12.8 (5)	9.3 (5)	17.3 (22)	
Foreign-born (FB); % (*n*)	79.2 (179)	92.7 (38)	83.3 (45)	73.3 (96)	.012
≤ 5 years living in U.S.[¶]; % (*n*)	14.5 (26)	26.3 (10)	11.1 (5)	11.7 (11)	.094
Female; % (*n*)	65.9 (149)	65.8 (27)	59.3 (32)	65.8 (90)	.476
Interview in Spanish; % (*n*)	85.8 (194)	92.7 (38)	83.3 (45)	84.7 (111)	.437
Years living in U.S.; mean (*n*)	19.2 (179)	11.2 (38)	21.0 (45)	21.5 (96)	.001
# Border crossings in past 30 days; mean (*n*)	2.6 (225)	0.66 (41)	0.72 (54)	4.04 (127)	.001
# People in household; mean (*n*)	4.3 (225)	5.49 (41)	4.26 (54)	3.98 (130)	<.001

* Region 1 is in northern San Diego County; Region 2 is in central San Diego County; Region 3 is in southern San Diego County.
† Region proportions were compared by using the chi-square test.
‡ Region means were compared by using ANOVA.
¶ Foreign-born respondents only.

bivariate analyses, Chi-square tests and an ANOVA were used to test the association between influenza variables and key covariates, including age, sex, country of birth, and region of San Diego County. All statistical tests accounted for the cluster variability generated by the survey's multistage sampling scheme.

RESULTS

Of the 420 homes approached, interviewers contacted a household member in 325 (77.4%) homes. Of these, 81 (24.9%) refused to participate in the survey, 18 (5.6%) were ineligible due to age or non-Hispanic ethnicity, and 226 (69.5%) household members completed the survey. Demographic characteristics varied across the three regions of San Diego County (Table 1). Hispanic populations surveyed in Regions 2 (Logan Heights in central San Diego) and 3 (San Ysidro adjacent to the US-Mexico border) were older and had fewer total household members than the respondents in Region 1 (Vista). Also, foreign-born respondents in Regions 2 and 3 had lived in the US longer than those in Region 1. Respondents in Region 3, adjacent to the international border, crossed the US-Mexico border more frequently than respondents in Regions 1 and 2.

Overall, nearly 89% of the respondents were aware of the influenza vaccine, but a higher percentage of Hispanic females (96.0%) were aware than Hispanic males (75.3%) (Table 2). Overall, 42% of respondents indicated they received an influenza vaccination at some time in their life with differences dependent on age, language of interview, and sex of respondent (Table 2). Specifically, 67.7% of respondents aged ≥65 years and 33.3% of respondents aged 50–64 years, age groups targeted for influenza vaccination, received an influenza vaccination at some time in their life. When we examined lifetime vaccination rates by age and sex, we found that 30.8% and 35.3% of Hispanic men and women, respectively, aged 50–64 years were vaccinated (P=.706) and 33.3% and 81.8% of Hispanic men and women, respectively, aged ≥65 were vaccinated (P=.005) (data not shown).

Nearly 52% of respondents aged ≥65 years and 16.7% of respondents aged 50–64 years received an influenza vaccination in the previous 12 months. The percentage of Hispanic males and females aged 50–64 years who received an influenza vaccination in the previous 12 months was 7.7% and 23.5%, respectively (P=.282), and the percentage of Hispanic males and females aged ≥65 years who received an influenza vaccination in the previous 12 months was 33.3% and 59.1%, respectively (P=.191).

Similar differences between sexes were seen when we examined the utilization of the influenza vaccine among the aged 18–49 years group. Specifically, 30.9% and 42.6% of Hispanic men and women, respectively (P=.148), aged 18–49 years reported receiving an influenza vaccination in their lifetime. Similarly, 9.3% and 20.4% of Hispanic men and women, respectively (P=.074), reported receiving an influenza vaccination during the previous 12 months. (data not shown)

Respondents were also asked if they knew of ways to decrease the risk of influenza infection other than through vaccination. Seventy percent (95% CI=62%–79.5%) reported that they knew of ways to decrease the risk of influenza infection besides a vaccination: by practicing frequent hand washing (74.3%; 95% CI=64.7%–84.0%), covering their coughs (67.1%; 95% CI=49.1%–85.1%), staying home when ill (47.0%; 95% CI=28.7%–68.4%), and getting sufficient sleep (42.1%; 95% CI=25.9%–58.3%). We also found that 68.1%, 89.3%, and 67.7% of respondents aged 18–49, 50–64, and ≥65 years, respectively, report-

Table 2. Awareness of influenza vaccine and influenza vaccination history among survey respondents, San Diego County, 2006

	Awareness		Lifetime		Previous 12 Months	
	Percent (*n*) (*N*=226)	*P**	Percent (*n*) (*N*=226)	*P**	Percent (*n*) (*N*=226)	*P**
Overall	88.9 (201)	—	42.0 (94)	—	21.5 (48)	—
Age (years)[†, ‡, §, ¶]		.662		.001		.0004
18–49	87.9 (145)		38.9 (63)		16.7 (27)	
50–64	93.3 (28)		33.3 (10)		16.7 (5)	
≥ 65	90.3 (28)		67.7 (21)		51.6 (16)	
Education		.441		.819		.947
≤ 12 years	88.8 (167)		41.9 (78)		22.0 (30)	
> 12 years	93.8 (30)		43.8 (14)		22.6 (7)	
Preferred language for interview		.798		.068		.113
Spanish	88.7 (172)		39.6 (76)		19.9 (38)	
English	90.6 (29)		56.3 (18)		31.3 (10)	
Country of birth		.419		.410		.180
US-born	85.1 (40)		47.8 (22)		28.3 (13)	
Foreign-born	89.9 (161)		40.5 (72)		19.8 (35)	
Years in US**		.149		.205		.943
≤ 5 years	80.8 (21)		30.8 (8)		19.2 (5)	
> 5 years	91.5 (140)		42.1 (64)		19.9 (30)	
Sex		.0003		.006		.016
Male	75.3 (58)		31.2 (24)		11.8 (9)	
Female	96.0 (143)		47.6 (70)		26.5 (39)	
Region[e]		.210		.181		.652
Region 1	87.8 (36)		40.0 (16)		22.5 (9)	
Region 2	83.3 (45)		31.5 (17)		16.7 (9)	
Region 3	91.6 (120)		46.9 (61)		23.3 (30)	

* Chi-square test.
† 18–49 vs 50–64, *P*=.045; other comparisons are not significant.
‡ Lifetime: 18–49 vs ≥65, *P*=.002; 50–64 vs ≥ 65, *P*=.005; other comparison is not significant.
§ Previous 12 months: 18–49 vs ≥65, *P*=0.001; 50–64 vs ≥65, *P*=.014; other comparison is not significant.
¶ Lifetime: Region 2 vs Region 3, *P*=.039; other comparisons are not significant.
** Foreign-born respondents only.

ed that they knew of ways to decrease the risk of influenza infection besides the vaccine (*P*=.069). Knowledge of ways to decrease the risk of influenza infection besides the vaccine among respondents in regions 1, 2, and 3 was 51.2%, 67.3%, and 78.3%, respectively (*P*=.026), with region 3 significantly greater than region 1 (*P*=.018; all others were not significant).

About half the respondents, 50.2% (95% CI=39.1%–61.3%), indicated that they would be very likely to restrict their travel during an outbreak of pandemic influenza. Nearly three-quarters of the respondents, 74.0% (95% CI=64.0%–82.0%), indicated that they would adhere to home isolation when ill during an outbreak of pandemic influenza. There were no differences between key covariates such as age, sex, education, country of birth, and region.

DISCUSSION

Our regional survey among a sample of 226 Hispanics showed that the recommendation of a yearly influenza vaccination for persons aged ≥50 years is not being adhered to by Hispanics aged 50–64 years (16.7%) and ≥65 years (51.6%) in San Diego County. The latter age group's influenza vaccination rate in the previous 12 months

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was 38 percentage points below the *Healthy People 2010* objective of 90% for this age group.[18] In addition, the low influenza vaccination rates, in the previous 12 months and in lifetime, among Hispanic males compared with rates for females aged ≥65 years, suggest elderly men are at greater risk for influenza infection compared to women of the same age. Awareness about influenza vaccination was also greater among the female respondents than among male respondents in Region 1 – a largely immigrant population (93%) that reported much lower levels of knowledge of prevention measures for influenza, other than a vaccination, than the other two regions. This regional survey also showed that the Hispanic population in San Diego County is heterogeneous, as evidenced by the widely varied demographics of the respondents sampled in the three regions of the county.

The influenza vaccination rate among survey respondents aged ≥65 years (51.6%) is similar to rates among Hispanic persons aged 65 years and older in the 2000–2006 National Health Interview Surveys (NHIS) (range: 41.5%–55.7%).[19–25] The NHIS, a continuing, nationwide in-person survey of approximately 100,000 non-institutionalized civilian persons, is the main source of data for the nation's health. Multiple years of the NHIS confirmed that Hispanics aged ≥65 years were less likely than non-Hispanic White persons aged ≥65 years to have received an influenza vaccination in the previous 12 months (range: 63.0%–68.6%).

The 2003 National Adult Immunization Survey (NAIS) and the 2005 Behavioral Risk Factor Surveillance System (BRFSS) data showed similar percentages of Hispanics aged ≥65 years receiving an influenza vaccination in the previous 12 months: 55.5% and 52.5% respectively, close to the percentage in our survey (51.6%).[26,27] The NAIS also reported that 74.6% of Hispanics received an influenza vaccination at some point in their life compared to 67.7% in our survey. The BRFSS data showed a similar percentage (22.6%) of Hispanics aged 18–64 who received an influenza vaccination in the previous 12 months (20.0% in our survey).

Although the NHIS, NAIS, and BRFSS yielded similar results to our survey, they used different methodologies to identify respondents. Two of these national surveys are telephone surveys, which exclude persons without a home phone, a listed number, or someone at home to answer calls. Many Hispanics may not have home telephone access. Our survey identified a representative sample of Hispanic households in three regions of San Diego County by administering a door-to-door survey to capture Hispanic households, including those without telephone access. The respondents in our survey are a unique border population composed of nearly 80% immigrants that have a different risk factor profile for influenza than a national sample of Hispanics. Also, unlike national surveys, our KAP survey examined the association between influenza vaccination rates and key covariates (eg, age, sex, education) among Hispanics. The national surveys simply reported vaccination rates among persons aged ≥65 years for three racial-ethnic groups, including Hispanics.

Our finding of lower influenza vaccination rates among Hispanics aged ≥65 years compared to non-Hispanic whites in the 2006 NHIS may have several possible explanations. First, our observations may be a product of the two relatively mild influenza seasons San Diego County experienced prior to the survey. Second, lack of access to health care and limited or lack of insurance for influenza vaccination among the largely immigrant population may also play a role. The Pew Hispanic Center found that 42% of foreign-born Hispanics did not have health insurance, compared with 25% of US-born Hispanics.[28]

This survey also highlights the need to implement educational and outreach efforts to inform the Hispanic community about influenza that are not only culturally competent, but are also responsive to heterogeneity within the Hispanic population. Differences in awareness and practices by age, sex, and language among the Hispanic survey respondents indicate that varied educational tactics are needed. Most educational efforts targeted to Hispanics are simple translations of material into Spanish, which is unlikely to be sufficient to reach this heterogeneous population. Intervention efforts beyond posters and brochures need to be explored such as Spanish-language promotora/navegador health education programs. Promotoras have been advocated for and initiated as an effective means to reach members of growing migrant and immigrant Latino communities in the United States because they are trusted members of the community and can provide the most tailored and culturally relevant messages.

The survey's findings should be interpreted in light of certain limitations. First, the response rate was 53.8% among all houses approached and 69.5% among households in which a person answered the door. Also, although the sample size of 226 allowed us to generate population-based estimates for the overall population, the sample did not provide sufficient statistical power to conduct multivariate analyses. Table 2 shows several examples in which a practical difference in influenza vaccination status was seen between key covariates (eg, foreign birth), but the comparisons lacked sufficient power to achieve statistical significance. The majority of respondents in the study were under 50 years of age and, similarly, the number of Hispanics aged ≥65 years was low because the questions regarding influenza were part of a larger KAP survey regarding several health-related issues, for which this older population was not specifically targeted. Finally, the

study population was limited to Hispanics. Therefore, direct comparisons could not be made to the non-Hispanic White population in San Diego County. Despite these limitations, the survey generated estimates of influenza vaccine awareness and influenza vaccination rates among a representative sample of Hispanics in San Diego County. The US Census Bureau's 2006 American Community Survey (ACS) found a similar age distribution among Hispanics in San Diego County compared to this survey.

CONCLUSION

The survey showed high awareness of the influenza vaccine and other preventive measures, notably hand hygiene and cough covering, among Hispanics in San Diego County. However, the survey also revealed relatively low vaccination rates, particularly among the age groups recommended to receive a vaccination. Differences in awareness and vaccination rates between Hispanic males and females across all age groups indicate that educational outreach efforts should specifically target Hispanic men aged ≥65 years. This survey also highlights the need to implement educational and outreach efforts to inform the Hispanic community about influenza that are not only culturally competent, but are also responsive to heterogeneity within the Hispanic population. Differences in awareness and practices by age, sex, and language among the Hispanic survey respondents indicate that varied educational tactics are needed. Most educational efforts targeted to Hispanics are simple translations of material into Spanish, which is unlikely to be sufficient to reach this heterogeneous population.

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AUTHOR CONTRIBUTIONS

Design concept of study: Bethel, Waterman
Acquisition of data: Bethel
Data analysis and interpretation: Bethel, Waterman
Manuscript draft: Bethel, Waterman
Statistical expertise: Bethel
Acquisition of funding: Waterman
Administrative, technical, or material assistance: Waterman
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