

HEALTH DISPARITIES AND PREVENTION: RACIAL/ ETHNIC BARRIERS TO FLU VACCINATIONS

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ABSTRACT: To address the widening disparity between Whites and non-Whites for influenza vaccination rates, this study employed the Health Belief Model to examine these rates in five racial/ethnic groups (White, Latino, African American, Filipino American, and Japanese American) to identify modifiable determinants of vaccination by race/ethnicity. A 2004 telephone survey of parishioners of faith-based congregations aged 50–75 years in Los Angeles and Honolulu assessed influenza vaccination rate, perceived susceptibility to influenza, perceived severity of illness, and the self-reported main barrier to influenza vaccination. Logistic regression models for each race/ethnic group predicting vaccination dependent upon perceived susceptibility to influenza, perceived severity of illness, and sociodemographic characteristics were estimated. Model parameters were used to generate standardized predictions of vaccination rates by race/ethnic group. In the multivariate models, Whites and African Americans who were very concerned about getting the flu were significantly more likely to be vaccinated (96% and 91%, respectively), compared with those who were not concerned (45% and 33%). However, vaccination rates among Latinos who were very concerned about getting the flu (54%), although significantly higher than Latinos who were not concerned (34%), were lower than for Whites and African Americans. Examination of the main barriers to vaccination revealed that Latinos were more likely to report access and cost barriers, while African Americans were more likely to raise issues of mistrust such as concern that the vaccine causes influenza. Distinct barriers to influenza vaccination exist among racial/ethnic groups. Vaccination programs may benefit from addressing these specific and unique concerns.

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INTRODUCTION

Vaccination of persons at-risk from influenza is a cost-effective means to decrease mortality and morbidity.¹⁻⁴ At least 36,000 deaths per year in the United States are attributed to influenza, and persons 65 years and older or with chronic medical conditions account for the majority of these deaths.⁵ In light of this, the US Preventative Services Task Force recommends that all individuals 65 years and older or with chronic medical conditions be vaccinated for influenza, and the Advisory Committee on Immunization Practices recommends that all persons 50 years and older receive annual influenza vaccines.⁶⁻⁷

Although rates of influenza vaccination among those at risk are gradually increasing, over 30% of adults over 65 years of age were not immunized in 2002.⁸ Vaccination rates also vary among racial/ethnic groups. According to the 2002 National Health Interview Survey, only 51% of African Americans and 55% of Latinos over the age of 65 were vaccinated compared to 69% of Whites. The low vaccination rates of these two groups have been confirmed in other studies.⁹⁻¹²

Despite the obvious disparity in flu shot receipt, few studies have probed the causes of low vaccination rates among African Americans and Latinos. In addition most studies do not examine vaccination rates among Asian Americans. The few studies that do examine Asian Americans have aggregated them into a single ethnic group and have found no difference in vaccination rates between Whites and Asian Americans. No study has disaggregated Asian American subgroups to examine their vaccination rates.

The purpose of this study is (1) to examine and compare influenza vaccination rates among parishioners 50 to 75 years old of White, African American, Latino, Japanese, and Filipino descent, and (2) to use the Health Belief Model (HBM)^{13,14} to identify modifiable determinants of influenza vaccination by race/ethnicity.

METHODS

We used data collected between March and August 2004 from a telephone survey of members from 76 faith-based congregations in Los Angeles and Honolulu. Of note, this survey was conducted prior to the

influenza vaccine scarcity of October 2004 to April 2005. Enumerations of faith-based congregations in the two cities were compiled from phone books, websites, and denominational listings. Congregations that were randomly selected from these lists were approached and those with at least 85 active members 50 to 75 years old who could speak English or Spanish were invited to participate. Parishioners in participating congregations were recruited to complete a 30-minute telephone survey. The overall response rate was 88%.

A total of 76 congregations were recruited from both Los Angeles (n = 48) and Honolulu (n = 28) with the following racial/ethnic breakdown (predominant ethnicity was defined as 60%+ of congregation members are of one racial/ethnic group): 20 White, 6 African American, 15 Latino, 8 Japanese American, 12 Filipino American, 1 Korean American, 2 Pacific Islander. The remaining 12 congregations were considered 'mixed' (no one ethnicity 60%+). Overall 2208 members 50 to 75 years old completed the telephone interview in English or Spanish, among whom 841 self-identified as White (40%), 184 as African American (8%), 410 as Latino (19%), 307 as Japanese American (14%), and 218 as Filipino American (10%).

Data from 255 members were excluded from our analysis (11%) because the numbers in the ethnic groups represented were too small, were mixed ethnicity or lacked a specific ethnic identifier. Of Asian Americans, only Japanese Americans and Filipino Americans had the sufficient numbers necessary to be included. Language barriers prevented many other Asian Americans from participating in the study, particularly in Los Angeles.

We used the HBM^{14,15} which has been used extensively in research to explain changes in and maintenance of health behaviors and to test behavioral interventions to guide our analysis of predictors of influenza vaccination. The key predictors of health behavior in the HBM include perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy.^{13,14} Empirical research applying the HBM has shown that perceived barriers was the most powerful single predictor of the HBM dimensions for all behaviors, and although both perceived susceptibility and perceived benefits were important overall, perceived susceptibility was a stronger predictor of preventive health behavior.¹³ Therefore of key HBM constructs, our analysis focuses on perceived susceptibility, perceived severity, and perceived barriers as the most important predictors of influenza vaccination.

The main independent variable was race/ethnicity. We assessed other modifying variables such as age (50 to 64 years old vs. 65 to 75 years old), gender, education (less than high school, high school graduate, some

college, college graduate or more), annual household income (<\$25,000, \$25,001 – \$50,000, \$50,001 – \$75,000, >\$75,000), place of birth (US/US territory/Born to a US citizen abroad vs. other), city of residence (Los Angeles vs. Honolulu), health insurance (y/n), chronic medical condition (y/n), diagnosis of cancer (y/n), and frequency of church attendance (more than weekly, weekly, less than weekly). The presence of a chronic medical condition was defined as having one or more of the following diagnoses: diabetes, hypertension, heart disease, or chronic lung conditions.

All the respondents were asked the following two variables from the Health Belief Model: perceived susceptibility to influenza and perceived severity of illness if they contracted influenza. We measured perceived susceptibility to influenza by responses to the question “How concerned are you about getting the flu?” Individuals were asked to give one of three choices: (1) very concerned, (2) somewhat concerned, and (3) not at all concerned. Perceived severity of getting influenza was measured by the question “How would getting the flu affect your life?” Individuals could respond in three ways: (1) getting the flu makes you very sick, (2) getting the flu makes you mildly sick, and (3) getting the flu is no big deal.

The last variable, perceived barriers to influenza vaccination, was asked only of respondents who did not get influenza vaccination in the past year. We used an open-ended question, “What is the main reason you did not get a flu shot in the past year?” After examining all the responses, we identified 12 different response categories. Two investigators independently reviewed the transcript and coded each response to the 12 identified categories (kappa = 0.84). If there was disagreement by the two investigators, a third investigator broke the tie.

The twelve response categories were (1) I do not need it, (2) influenza vaccine causes influenza, (3) influenza vaccine does not work, (4) active refusal of influenza vaccine without specific reasons, (5) influenza vaccine eligibility myths, (6) fear of injections or pain, (7) access and cost issues, (8) shortage of vaccines, (9) lack of knowledge of influenza vaccine or no one told the patient to get influenza vaccine, (10) healthcare professionals did not give the vaccine, (11) personal history of allergy to influenza vaccine or eggs, and (12) general excuses. The example responses from each category are listed in the footnotes of Table 3.

Statistical Analysis

We constructed bivariate cross tabulations and used the Chi Square test of significance to examine differences by race/ethnicity on sociodemographic factors, perceived severity of influenza, perceived susceptibility

to getting influenza, perceived barriers to influenza vaccination, and receipt of influenza vaccine.

Using multivariate logistic regression, we first evaluated the independent effect of race/ethnicity on the receipt of influenza vaccine while controlling for the following covariates: age, gender, education, annual household income, nativity, health insurance, presence of chronic medical condition(s), church attendance, perceived susceptibility to influenza, and perceived severity of getting influenza. We did not include gender and church attendance as covariates in the final multivariate model due to lack of statistical significance in the bivariate and importance in our conceptual model. We then used stratified multivariate logistic regression to assess the differential effect of the covariates listed above on likelihood of receiving an influenza vaccine in the past year for each racial/ethnic group. Of note, we also conducted the bivariate and multivariate analyses on participants age 65 years and older and found the results were consistent with the broader age group of 50 to 75 years. We present standardized predictions that were calculated by using the model parameters and the observed value for each predictor except the characteristic of interest. Separate sets of predictions were calculated for each value of each characteristic. For example, the predicted influenza vaccination rate for Whites was calculated by re-coding every observation as White race/ethnicity then averaging across the data set. PROC GENMOD in SAS® v8.2 (SAS Institute Inc., Cary NC) was used for all analyses to adjust for the intra-cluster correlation among members of the same congregation.

Annual household income had 8% missing values, and perceived severity of getting influenza had 4% missing values. There were no variations in distribution of these missing values stratified by race/ethnicity. Other variables had missing values of 1% or less.

RESULTS

Sample Characteristics

Table 1 displays demographics, socioeconomic characteristics, attitude toward getting influenza, and unadjusted and adjusted percentages of influenza vaccination by race/ethnicity. Latinos stood out in sharp contrast to Whites and other racial/ethnic groups with regard to education, annual household income, and health insurance status. While the majority of other participants had some college education (> 81%), most of the Latinos in the sample had less than a high school education (65%). A greater

TABLE 1
Profile of the Respondents^a

Demographic and Socioeconomic Characteristics	Total n = 1961 %	White n = 841 %	Black n = 184 %	Latino n = 410 %	Japanese n = 307 %	Filipino n = 218 %
Female	65	62	78***	62	66	73*
<i>Age</i>						
50 to 64 years	62	57	55	80***	58	56
65 to 75 years	38	43	45	20***	42	44
<i>Education</i>						
Less than High School	15	1	4**	65***	1	7***
High School Graduate	10	9	13	14	7	12
Some College	22	23	41*	13***	21	20
College Grad or more	53	67	42*	8***	71	61
<i>Annual Income:</i>						
< \$25,000	25	12	22*	60***	9	33***
\$25,001-\$50,000	23	22	24	22	24	25
\$50,001-\$75,000	15	17	22	5***	21	16
> \$75,000	31	42	26***	5***	43	22***
<i>City</i>						
Los Angeles	62	55	95***	97***	26	44
Honolulu	38	45	5***	3***	74	46
Born in US ^b	72	95	98	16***	96	29***
Insured	90	98	97	64***	99	90***
Chronic medical condition(s) ^c	41	36	58***	36***	44**	49**
Diagnosis of cancer(s)	18	29	15***	6***	12***	8***

<i>Church Attendance</i>							
More than weekly	22	18	39***	27*	9**	33***	
Weekly	57	53	54	60	65	59	
Less than weekly	21	28	7***	12***	25	11***	
<i>Attitudes Concerning Influenza</i>							
<i>How concerned are you about getting the flu? (susceptibility)</i>							
Very concerned	21	20	20	10***	27**	37***	
Somewhat concerned	39	44	36**	31***	44	28***	
Not at all concerned	39	35	45**	58***	29*	32	
<i>How would getting the flu affect your life? (severity)</i>							
Make you very sick.	20	23	23	15***	18	18	
Make you sick but not that bad.	52	54	55	43***	55	50	
Is no big deal	25	19	16	40***	20	27*	
<i>Influenza Vaccination</i>							
Unadjusted ^d	62	71	46***	44***	73	58*	
Adjusted ^e	-	65	49***	61	65	50***	

^ap < 0.05, **p < 0.01, ***p < 0.001 compared to Whites using Wald Chi-square. Significance test based on Wald Chi-Square test of model coefficient adjusted for clustering at the church level.

^bThis category also includes those who are born in US territory or to US citizen abroad.

^cHave diagnosis of diabetes, hypertension, heart disease, or chronic lung conditions.

^dUnadjusted estimates were obtained by cross-tabulations of each variable by receipt of flu shot.

^eStandardized Predictions adjusted for demographic, socioeconomic factors, perceived susceptibility of getting the flu, and perceived severity of the flu using logistic regression.

proportion of Latinos (60%) than other racial/ethnic groups (<33%) reported an annual household income less than \$25,000 a year. Latinos have the highest uninsured rate (36%) followed by Filipino Americans (10%). The uninsured rate of African Americans and Japanese Americans did not significantly differ from that of Whites.

Influenza and Influenza Vaccination

A significantly greater proportion of African Americans (45%) and Latinos (58%) reported being not at all concerned about getting influenza ($p < 0.01$ when compared to Whites at 35%). In contrast a significantly greater proportion of Japanese Americans (27%) and Filipino Americans (37%) were very concerned about getting influenza ($p < 0.01$ when compared to Whites at 20%). When asked the question "How would getting the flu affect your life," a significantly greater proportion of Latinos (40%) and Filipino Americans (27%) than Whites (19%) reported that getting influenza is "no big deal."

The majority of Whites (71%) and Japanese Americans (73%) had influenza vaccination in the past year, while only 46% of African Americans, 44% of Latinos, and 58% of Filipino Americans had done so ($p < 0.05$) (Table 1). While the difference in influenza vaccination rate between Whites and Latinos was not statistically significant in the multivariate model, the difference between Whites (65%) and African Americans (49%) and Whites and Filipino Americans (50%) persisted after controlling for covariates ($p < 0.001$).

Determinants and Barriers to Influenza Vaccination

Significant determinants of influenza vaccination for all races/ethnicities included age and perceived susceptibility to influenza (Table 2). Perceived susceptibility to influenza affected the receipt of influenza vaccination in greater magnitude among Whites (96% among very concerned vs. 45% among not at all concerned, $p < 0.001$) and African Americans (91% among very concerned vs. 33% among not at all concerned, $p < 0.001$) than Latinos (54% among very concerned vs. 34% among not at all concerned, $p < 0.01$) after controlling for other covariates. In contrast perceived severity of having influenza was a statistically significant factor only among African Americans after controlling for other demographic, socioeconomic, and health belief factors.

Household income was a significant determinant for influenza vaccination when controlling for other determinants of receipt of

TABLE 2
 Standardized Predictions of Influenza Vaccination by Covariates Adjusted Using 5 Multivariate Analyses
 Stratified by Race/Ethnicity^a

<i>City</i>	<i>White</i> (<i>n</i> = 837) %	<i>Black</i> (<i>n</i> = 184) %	<i>Latino</i> (<i>n</i> = 410) %	<i>Japanese</i> (<i>n</i> = 306) %	<i>Filipino</i> (<i>n</i> = 218) %
Los Angeles	68**	^b	^b	71	50
Honolulu ^c	75	^b	^b	74	67
<i>Age</i>					
50 to 64 years	64***	38*	38***	65***	51***
65 to 75 years ^c	80	58	69	87	70
<i>Education</i>					
Less than High School	68	38	44	^d	40
High School Graduate	65	60	44	74 ^d	66
Some College or more ^c	71	45	44	76	60
<i>Annual Income</i>					
< \$25,000	68	34**	44	64	61
\$25,001–\$50,000	69	50	47	73	50
\$50,001–\$75,000	72	44	^e	76	66
> \$75,000 ^c	72	53	47 ^e	74	60
<i>Nativity</i>					
US Born ^c	71	46	38	74	68
Foreign Born	77	63	45	63	58

Table 2 (Continued)

	White (n = 837) %	Black (n = 184) %	Latino (n = 410) %	Japanese (n = 306) %	Filipino (n = 218) %
<i>Insurance Status</i>					
Insured ^c	71	46	46	^b	59
Uninsured	41	64	40*	^b	63
<i>Presence of Chronic Conditions</i>					
Yes ^c	76	46	49	79	64
No	68*	47	41*	70*	54*
<i>Diagnosis of Cancer</i>					
Yes ^c	69	64	52	75	75
No	71	43*	44	73	58
<i>Attitudes Concerning Influenza</i>					
<i>How concerned are you about getting influenza? (susceptibility)</i>					
Very Concerned ^c	96	91	54	96	80
Somewhat Concerned	80***	42***	61	73***	56**
Not at all concerned	45***	33***	34**	56***	42***
<i>How would getting influenza affect your life? (severity)</i>					
Make you very sick ^c	69	56	50	68	63
Make you sick but not that bad	72	45	41	77	59
Is no big deal	71	38**	46	70	56

^a*p < 0.05, **p < 0.01, ***p < 0.001 compared to the reference group indicated by the superscript c.

^bThese covariates were excluded from the stratified multivariate models because of insufficient cell size (n < 5).

^cThis is the reference group for the Chi square comparison.

^dThis cell includes Japanese American with high school graduates or less. Japanese Americans with less than high school education was combined with high school graduates because of insufficient cell size.

^eThe reference income category in the multivariate model for influenza vaccination among Latinos is > \$50,001. The income category (\$50,001 - \$75,000) was combined with (> \$75,000) because of insufficient cell size.

preventive care among African Americans only (Table 3). African Americans in the sample with household incomes of \$25,000 or less (34%) were significantly less likely to be vaccinated than African Americans with household incomes of more than \$75,000 (53%) ($p < 0.01$). Insurance was a significant determinant for influenza vaccination among Latinos only. When controlling for demographic, socioeconomic, and health belief factors, Latinos without health insurance (40%) were significantly less likely to be vaccinated than Latinos with health insurance (46%) ($p < 0.05$). Although insured African Americans appeared to be less likely to be vaccinated than the uninsured (46% vs. 64%), this difference was not statistically significant. Presence of chronic conditions was a significant positive determinant of influenza vaccination among all racial/ethnic groups except African Americans. The diagnosis of cancer was a significant positive determinant of influenza vaccination among African Americans only.

When participants were asked for the chief reason for not getting influenza vaccination in the past year, "Do not need influenza vaccine" was the most common reason cited by respondents for all racial/ethnic groups except African Americans (Table 3). Approximately 32% of unvaccinated African Americans believed that influenza vaccination causes influenza or serious side effects compared to 18% for Whites, 13% for Latinos, 11% for Japanese Americans, and 22% for Filipino Americans. In addition, 10% of African Americans strongly refused influenza vaccination and gave responses such as "I don't want it, I don't like it, I decided not to get it, or I prefer not to get it" as the main reason for nonvaccination compared to 4% of Latinos and 4% of Whites ($p < 0.01$).

Approximately 13% of Latinos cited access and cost issues as the main reason for nonvaccination compared to $\leq 2\%$ in other racial/ethnic groups (Table 3). Significantly more Latinos (21%) and Filipino Americans (20%) than Whites (11%) and African Americans (11%) cited "too lazy, no time, inconvenient, too busy, or I forgot" as the main reason for nonvaccination in the past year ($p < 0.01$).

DISCUSSION

African Americans and Latinos were significantly less likely to be vaccinated for influenza than Whites, a result supported by earlier studies.^{8,9,16} While most studies showed no difference in influenza vaccination rates between Whites and aggregated Asian Americans, we found that Filipino Americans were significantly less likely to be vaccinated than Whites.

TABLE 3
 The Main Reason why Respondents did not get an Influenza Vaccine in the Past 12 Months^a

	Total n = 738 %	White n = 239 %	Black n = 99 %	Latino n = 228 %	Japanese n = 81 %	Filipino n = 91 %
Do not need it ^b	32	35	30	29	31	37
Influenza vaccine causes influenza ^c	18	18	32***	13	11	22
General excuses ^d	16	11	11	21**	15	20**
Influenza vaccine doesn't work ^e	6	9	6	4	11	3
Active refusal of influenza vaccine (without specific reasons) ^f	5	4	10**	4	10**	3
Access and Cost issues ^g	5	1	0 ^l	13***	0 ^l	2
Shortage of vaccines ^h	4	4	4	4	7	2
Afraid of pain	3	5	1	1	5	2
Lack of knowledge of influenza vaccine or no one told patient to get flu shot ⁱ	3	2	1	4	2	1
Healthcare professionals didn't give influenza vaccine ^j	3	3	0	5	2	0 ^l

Personal history of allergy to influenza vaccine or eggs	3	5	2	0 ¹	4	3
Influenza vaccine eligibility myths ^k	2	3	2	1	1	1

^a*p<0.05, **p<0.01, ***p<0.001 compared to Whites using Wald Chi Square with cluster adjustment. The total sample size was reduced because it only included nonvaccinated individuals.

^bResponse examples - rely on natural immunity, rely on medications or herbal products, I don't get the flu, I am healthy, I am not at risk, it doesn't interest me, not afraid or concerned of getting the flu.

^cResponse examples - gives me a cold, makes people sick, flu shot made me sick, flu shot made friends or family sick, flu shot is a live virus or germs, I'm afraid of side effects or safety concerns.

^dGeneral excuses but not actively refusing the shot and access or cost not the main problem. Response examples - Too lazy, no time, inconvenient, too busy, I forgot.

^eResponse examples - I don't believe in the flu shot, I have never had a flu shot, I still get the flu after the flu shot.

^fResponse examples - I don't want it, I don't like it, I decided not to get it, I prefer not to get it.

^gResponse examples - No insurance, cannot afford flu shot, never been to health care providers, no health care provider, don't know where to go, no one can take me, never gone to a place where they give flu shots.

^hResponse examples - Doctor's office, clinic, or any other place out of vaccines, didn't get it because believed that vaccine in short supply.

ⁱResponse examples - I don't know I suppose to get one, no reminder to get a flu shot, it never occurred to me, I didn't think about it.

^jResponse examples - Health care professionals (i.e. doctor, nurse, alternative medicine practitioner) don't feel patient need it, didn't give patient the shot, did not recommend the shot.

^kResponse examples - Flu shot last longer than 1 year, cannot get shot because patient has non-flu shot allergies, allergic to poultry but not eggs, I can't get flu shot because I am too sick, I can't get the flu shot because I have a cold.

^lChi-square not calculated because of 0 value.

Concern about getting influenza had the strongest and most significant association with receipt of influenza vaccine among Whites, African Americans, Japanese Americans, and Filipino Americans. When unvaccinated individuals were asked for the main reason why they did not get influenza vaccination in the past 12 months, the most common answer given was that they did not need the vaccine. Respondents felt that they did not need the vaccine because they believed they were not at risk of getting influenza or they relied on other preventive measures. These findings correspond with results from the 2001–2002 Medicare Current Beneficiary Survey which reported that not knowing who should be vaccinated was the leading reason for nonvaccination.¹⁷

We found notable variation in determinants of nonvaccination among different racial/ethnic groups. Household income and perceived severity of getting the flu were significant determinants of receipt of influenza vaccine among African Americans only and not of other racial/ethnic groups. This suggests that very low-income African Americans are particularly at risk of nonvaccination and that a strategy emphasizing the possible severe consequence of having the flu may be useful to increase vaccination rates in the African American community.

On closer inspection, the vaccination rate disparity between Whites and African Americans is not explained solely by demographic/socioeconomic factors or perceived susceptibility and severity of getting the flu. When respondents were asked for the main reason for nonvaccination, African Americans were more likely than any other group to cite concern over the influenza vaccine causing influenza or serious side effects. This finding is supported by Hebert et al examined the 1995–1996 Medicare Current Beneficiary Survey and found that among unvaccinated individuals, African Americans age 65 years and older were more likely to be concerned over the possible negative outcomes of vaccination than Whites.¹⁸ Previous studies have revealed that African Americans place little trust in government agencies, medical researchers, or health care providers stemming from discrimination in the US health care system, and this lack of trust may significantly hinder delivery of preventive care.^{19–21} Further research will be needed to explore strategies to address African Americans' concerns over the influenza vaccine.

Latinos mentioned structural barriers as the major factors keeping vaccination rates low. In stratified multivariate analysis, health insurance status was a significant determinant of influenza vaccination only among Latinos. When asked for the main reason for nonvaccination, Latinos cited access (i.e. do not know where to go, no transportation, no health care

provider) and cost barriers more than any other racial/ethnic group did. Bautista et al found that compared to Whites, Latinos were more likely to report lack of transportation to vaccination sites and inability to afford vaccination thus supporting our findings.²²

Filipino Americans seemed to share many of the same barriers to influenza vaccination as Whites and Japanese Americans. Originally the difference in influenza vaccination rates between Whites and Filipino Americans was only marginally significant, but the difference increased to statistical significance when we controlled for covariates. In particular, perceived susceptibility to the flu was the main covariate that generated an increase to statistical significance. Although Filipino Americans were more likely to be very concerned about contracting influenza than Whites, paradoxically they were less likely to be vaccinated. More research will be needed to elucidate why flu vaccination rates among Filipino Americans is disproportionate to their concern of getting influenza.

Our study was not population-based; we studied faith-based parishioners aged 50 to 75 years in two cities, which limits our ability to generalize our findings. However the 2002 General Social Survey found that 60% of adults aged 50 to 75 years attended faith-based congregations at least monthly, indicating that a sizable proportion of the adult population can be reached through faith-based organizations. Many of the findings of this study are consistent with the results of other large population-based surveys, and we have no reason to suspect that the health beliefs of parishioners regarding flu vaccination are any different from the rest of the population.

In conclusion, our study offers four main policy implications for increasing influenza vaccination rates in the United States. First, interventions to increase influenza vaccination rates should increase the general effort to increase the public's awareness of the seriousness of contracting influenza. Second, we need ethnic specific strategies to address the issues of mistrust by African Americans expressed in sentiments such as their concern that the influenza vaccine causes influenza, and linguistically appropriate community outreach to Latinos to provide information on ways to obtain free or low-cost flu vaccination. Finally, our study emphasizes the importance of disaggregating Asian American and Pacific Islander subgroups to examine health and receipt of health care; notably the low vaccination rates among Filipino Americans were masked by the high rates among Japanese Americans. Future interventions for influenza prevention will need to be specifically designed to meet the unique barriers to vaccination found in different racial/ethnic populations.

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