



Original article

Disparities in Vaccinations and Cancer Screening Among U.S.- and Foreign-Born Arab and European American Non-Hispanic White Women



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Article history: Received 27 March 2014; Received in revised form 27 June 2014; Accepted 8 October 2014

ABSTRACT

Background: Disparities in vaccinations and cancer screening exist when comparing foreign-born and U.S.-born women collectively and disaggregated by race and ethnicity. The purpose of this study was to estimate and compare the age-adjusted prevalence of not receiving a flu or pneumonia vaccine, clinical breast examination, mammogram or Pap smear among U.S.- and foreign-born White women by region of birth and examine associations while controlling for potential confounders.

Methods: We pooled 12 years of National Health Interview Survey data ($n = 117,893$). To approximate an “Arab-American” ethnicity, we identified 15 “Arab” countries from the Middle East region that comprise the Arab Nations. Data was requested from the National Center for Health Statistics Research Data Center. We used the χ^2 statistic to compare descriptive statistics and odds ratios (ORs) with 95% CIs were used for inferential statistics.

Findings: Compared to U.S.-born, foreign-born Whites from the Arab Nations had higher estimates of not receiving recommended vaccinations and cancer screenings. In crude and adjusted analyses, foreign-born Arab-American women were less likely to report receiving a flu vaccine (OR, 0.34; 95% CI, 0.21–0.58), pneumonia vaccine (OR, 0.14; 95% CI, 0.06–0.32), Pap smear (OR, 0.13; 95% CI, 0.05–0.31), or clinical breast examination (OR, 0.16; 95% CI, 0.07–0.37) compared with U.S.-born White women. There were no differences for mammography.

Conclusions: This national study examining uptake of flu and pneumonia vaccines and preventive cancer screenings suggests that estimates are lower for foreign-born Arab-American women compared with U.S.-born White women. Future studies should collect qualitative data that assess the cultural context surrounding prevention and screening behaviors among Arab-American women.

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The U.S. Centers for Disease Control and Prevention and the United States Preventive Services Task Force (USPSTF) provide recommendations for various vaccine and early screening uptakes based on scientific evidence that these efforts are effective in preventing or delaying disease ([Advisory Committee on Immunization Practices, 2011](#); [Smith, Brooks, Cokkinides,](#)

[Saslow, & Brawley, 2013](#)). Vaccines and cancer screenings are important clinical preventive care services recommended as part of routine preventive care by health care providers to reduce morbidity and mortality from disease. For example, the U.S. Centers for Disease Control and Prevention recommends a flu vaccine every year for all adults ages 19 and older and one dose of pneumonia vaccine for those ages 65 and older who lack evidence of immunity ([U.S. Centers for Disease Control and Prevention, 2011](#)). Among healthy women, the USPSTF recommends routine biennial mammogram screening to detect breast cancer for women 50 to 74 years old ([USPSTF, 2009](#)) and a Pap test to detect cervical cancer every 3 years for women 21 to 65 years old ([Moyer, 2012](#)). Clinical breast examinations may be useful for detecting breast cancer cases if it is the only screening test available ([USPSTF, 2009](#)).

Funding: No funding sources for the work reported in this manuscript.

Conflicts of interest: No financial conflicts of interest involving any of the co-authors.

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Although the aforementioned recommendations apply to all adults, disparities in vaccination and cancer screening exist by nativity status, race, and ethnicity. For example, in 2011, 55% of women self-reported a flu vaccine in the past year and 65% of women reported having a pneumonia vaccine (National Center for Health Statistics, 2012b). The age-adjusted prevalence of Pap tests was 73%; mammography use was 67% of women ages 40 and older and 69% of women ages 50 and older (National Center for Health Statistics, 2012b). However, foreign-born women were less likely to report breast examinations (Wong-Kim & Wang, 2006), mammography (Billmeier & Dallo, 2011; Brown, Consedine, & Magai, 2006) and Pap tests (Echeverria & Carrasquillo, 2006) when compared with U.S.-born women. These disparities exist when comparing foreign-born and U.S.-born women collectively and disaggregated by race and ethnicity (Argeseanu Cunningham, Ruben, & Narayan, 2008). Studies have compared foreign-born Hispanics and Asians with their U.S.-born counterparts (Argeseanu Cunningham et al., 2008), yet few researchers have compared these behaviors between U.S.- and foreign-born non-Hispanic White women.

Among White immigrants, limited research exists on screening behaviors for women from different geographic regions, including immigrants from Europe and the Middle East. Singh and Hiatt (2006) found that foreign-born women were 39% less likely to report having a Pap test and 10% less likely to report having a mammogram when compared with U.S.-born women after controlling for demographic and socioeconomic confounders. Disaggregated by race and ethnicity, foreign-born (compared with U.S.-born) non-Hispanic White women were 37% and 14% less likely to report having a Pap test and mammogram, respectively, after controlling for the same confounders (Singh & Hiatt, 2006). The U.S. federal government includes individuals from Europe, North Africa, and the Middle East in the non-Hispanic White racial group (Office of Management and Budget, 1997). This classification may overlook important disparities in health status and preventive health behaviors within each geographic region, such as Europe and the Middle East.

Minimal research exists on preventive health behaviors among European-American women and, to our knowledge, no research exists examining flu and pneumonia vaccine uptake among European Americans. Furthermore, no current literature exists which examines flu and pneumonia vaccine uptake or Pap smears comparing U.S.-born with foreign-born European-American women. Consedine and colleagues (2004) evaluated emotional characteristics and breast cancer screening knowledge and reported that Eastern European women had lower levels of mammography screening and clinical breast examinations as compared with U.S.-born European American women. Consedine, Magai, and Neugut (2012) later evaluated adherence to mammography guidelines among U.S.- and foreign-born women. Results indicated that foreign-born Eastern European women were less likely to report adherence to mammogram guidelines over time (Consedine, 2012).

Minimal research exists on preventive health behaviors among Arab-American women. To our knowledge, no current literature exists that examines flu and pneumonia vaccine uptake among Arab-American women. The majority of knowledge about preventive health behaviors of Arab Americans is gleaned from community-based surveys in Michigan. Screening behaviors of Arab-American adults (≥ 40 years of age) are measured by telephone and compared with other groups using the Special Cancer Behavioral Risk Factor Survey (Yassine, Wing, Wojcik, &

Tan-Schriner, 2010). In 2008, Arab-American women had lower estimates of clinical breast examination and Pap tests yet higher estimates of having a mammogram in the past 2 years (Yassine et al., 2010). Other research by Schwartz, Fakhouri, Bartoces, Monsur, and Younis (2008) found similar estimates of mammography use. Of the 399 Arab-American women surveyed, 70% self-reported ever having a mammogram and 58.1% reported having a mammogram every 1 to 2 years. Although mammography screening prevalence was high, these studies were conducted only in Michigan and results may be limited in generalizability to the rest of the United States.

Using national publicly available data, researchers have used the National Health Interview Survey (NHIS) to obtain representative estimates of diabetes and hypertension (Dallo & Borrell, 2006), serious psychological distress (Dallo, Kindratt, & Snell, 2013), functional limitations (Dallo, Booza, & Nguyen, 2013), and self-rated health (Read, Amick, & Donato, 2005). However, studies that report on preventive health behaviors among Arab Americans are not available. The studies that use NHIS data have included the general region of the "Middle East." The investigators did not limit the sample to only those from the Arab League of Nations (ie, considered Arab Nations) to ensure that the sample is that of "Arab Americans" rather than any individual from the region of the "Middle East." This is an important distinction to make because not all individuals from the Middle East living in the United States identify as Arab American.

To address this gap in the Arab-American health literature, the objectives of this study were to 1) estimate and compare the age-adjusted prevalence of not receiving a flu vaccine, pneumonia vaccine, mammogram, Pap test, or clinical breast examination among U.S.- and foreign-born White women by region of birth (Europe/Russia and the Arab Nations) and 2) examine these associations while controlling for potential confounders.

Methods

Survey

This study gathered data from the 2000/2011 NHIS family, person, sample adult, and cancer control modules. The NHIS is a population-based national survey that collects data on an expansive range of health topics through face-to-face interviews, including chronic disease prevalence, preventive health screenings, and health care utilization. Selected years include additional periodic modules that evaluate specific health conditions, screenings, and health behaviors, such as the cancer control module of interest in this study. The NHIS utilizes a multistage sampling design, which oversamples Hispanics, African Americans, and Asian Americans to obtain a representative sample of the U.S. population. Details of the NHIS, its sampling design and methods and specific health topics collected were reported previously (National Center for Health Statistics, 2012a).

Participants

The total unweighted sample (2000–2011) included 378,180 households, 388,072 families, and 984,160 persons. An adult (ages ≥ 18 years) representative of each family is selected to answer the sample adult module and periodic module. Of the 984,160 persons from the 12-year period, 320,827 individuals completed the sample adult section. For the purposes of this study, the sample was limited to non-Hispanic White women

(ages ≥ 18 years) who answered questions about place of birth, vaccinations and cancer screening behaviors. The final sample size (2000–2011) was 117,893 women. The NHIS included additional questions on recommended cancer screenings in 2003 and 2008 (including mammography and Pap smear) as well as a cancer control module in 2000, 2005, and 2010, which extensively evaluated cancer incidence, prevalence, screening (including mammography, Pap smear, and clinical breast examinations), and preventive health behaviors. The unweighted sample sizes for U.S.- and foreign-born White women were 39,393 women (U.S. = 37,902; Europe = 1,277; Arab Nations = 61) for 5 years of data combined (2000, 2003, 2005, and 2010) and 24,435 women (U.S. = 23,491; Europe = 816; Arab Nations = 39) for 3 years of data combined (2000, 2005, and 2010).

Variable Measurement

Predictor variables

The main predictor variable of interest in this study was region of birth among non-Hispanic White women. The predictor variable was created by compiling nativity status (U.S.- or foreign-born), place of birth (United States, Europe, the Arab Nations), ethnicity (non-Hispanic), and race (White) among women. The NHIS asks participants where they were born to determine nativity status. Participants who were not born in the United States, a U.S. territory, or on a U.S. military base overseas were asked if they were U.S. citizens. Participants who were not U.S. citizens were asked which country they were born in and responses were later categorized into geographic regions (Mexico, Central America and Caribbean Islands, South America, Europe, Middle East, Russia, India subcontinent, Asia, and Southeast Asia). Participants were asked whether they were Hispanic or Latino and given flashcards to specify their race (National Center for Health Statistics, 2011) based on the 1997 Office of Management and Budget federal racial and ethnic categories (National Center for Health Statistics, 2012a; Office of Management and Budget, 1997).

Previous studies evaluating the health of foreign-born Arab Americans have evaluated participants who indicated they were born in one of the countries in the Middle Eastern region. However, this geographic region includes countries which are not a part of the Arab League of Nations. We identified 15 “Arab” countries which overlap with the 25 countries included in the NHIS “Middle East region” of birth and the 22 countries that comprise the Arab League of Nations. The 15 countries used to create an Arab Nations region of birth variable are Iraq, Arab Palestine, Jordan, Lebanon, Saudi Arabia, Kuwait, Palestine, Syria, United Arab Emirates, Qatar, West Bank, Yemen, Bahrain, Gaza Strip, and Oman. Country of birth is a restricted variable in the NHIS; therefore, data were requested and compiled from the National Center for Health Statistics Research Data Center (National Center for Health Statistics, 2012c).

Outcome variables

The outcome variables evaluated in this study were vaccine uptake (flu and pneumonia) and cancer screenings (mammography, Pap smear, and clinical breast examination). Participants were asked whether they had ever had a pneumonia vaccine or if they had a flu shot in the last 12 months (yes or no). Women were asked whether they had ever had (yes or no) a clinical breast examination (2000, 2005, and 2010 only), mammogram, and Pap smear (2000, 2003, 2005, 2008, and 2010 only).

Covariates

Covariates included demographics (marital status and age), socioeconomics (current employment, education and imputed income), health insurance coverage and place where they most often seek health care, behavioral risk factors (BMI and smoking), and length of time in the United States (< 15 years, ≥ 15 years, U.S. born) as a proxy for acculturation based on previous studies (Dallo, Kindratt, et al., 2013).

Statistical Analysis

Descriptive statistics were used for demographics, socioeconomic (income data were imputed to determine poverty ratio), health care insurance and access, risk factors, and acculturation for White women born in the United States, Europe, and the Arab Nations. The χ^2 statistic was used to determine differences for all variables. Also reported was the age-adjusted prevalence of not receiving a flu vaccine, pneumonia vaccine, mammogram, Pap smear, and clinical breast examination among women from each region of birth. Multiple logistic regression was used to determine the association between region of birth (United States, Europe, the Arab Nations; predictor variable) and each cancer screening and vaccine (outcome variables) among White women while controlling for potential confounders (demographic, socioeconomic, health insurance coverage, access to care, behavioral risk factors, and length of time living in the United States). Sampling weights were used for all statistical analyses.

SAS 9.3 and SUDAAN version 10 were used to account for the sophisticated weighting in the NHIS sample design, multiple income imputations and age adjustment. Specific details about the NHIS methodology and weighting were reported previously (National Center for Health Statistics, 2012a). This project was approved by the National Center for Health Statistics Research Ethics Review Board and the National Center for Health Statistics Ethics Review Board to obtain and analyze restricted country of birth data (National Center for Health Statistics, 2012c). De-identified data were analyzed, which is exempt from federal regulations for the protection of human subjects.

Results

Selected characteristics of U.S.-born women ($n = 113,406$) and foreign-born White women from Europe ($n = 3,744$) and the Arab Nations ($n = 205$) are reported in Table 1. The mean age was lower among Arab-American women (41.0 years) when compared with U.S.-born (48.2 years) and foreign-born women from Europe (51.4 years). Arab-American women were more likely to be married (69.0%) compared with European-born (64.6%) and U.S.-born (63.7%) women. Arab-American women were more likely to have a bachelor's degree or higher (33.4%), yet, they were more likely to be unemployed (67.9%) and live below the poverty level (48.9%; all $p \leq .00$). Foreign-born White women from the Arab Nations had higher estimates of not having health insurance (17.4%) compared with European-born (11.7%) and U.S.-born (10.3%) women. Furthermore, Arab-American women were more likely to report no usual source of care (5.1%) when compared with their European (3.0%) and U.S. (2.2%) counterparts (all $p \leq .00$). Arab-American women reported higher estimates of not currently smoking (81.3%) and normal weight (52.0%). Compared with European-born women (30.5%), Arab-American women (52.6%) were more likely to live in the United States for fewer than 15 years.

Table 1Selected Characteristics of Sample for U.S.- and Foreign-Born White Females from Europe and the Arab Nations, NHIS 2000–2011 (*n* = 117,893)

	Non-Hispanic White Females			<i>p</i> value
	U.S. Born (<i>n</i> = 113,406)	Foreign Born		
		Europe (<i>n</i> = 3,744)	Arab Nations (<i>n</i> = 205)	
Mean age	48.2 (0.11)	51.4 (0.36)	41.0 (1.62)	.0000
Marital status				.0000
Never married	14.3 (0.20)	9.8 (0.61)	13.3 (3.52)	
Married/live with partner	63.7 (0.22)	64.6 (0.88)	69.0 (4.54)	
Divorced/widowed/separated	22.0 (0.16)	25.6 (0.73)	17.7 (3.30)	
Education				.0000
Less than HS	10.9 (0.16)	13.9 (0.68)	26.7 (3.92)	
HS/GED	30.1 (0.23)	25.9 (0.88)	21.8 (3.64)	
Some college/associate's	32.0 (0.19)	26.9 (0.85)	18.1 (3.02)	
Bachelor's or higher	27.0 (0.27)	33.3 (0.93)	33.4 (4.42)	
Imputed poverty level (>200%)	73.7 (0.27)	71.2 (1.00)	48.9 (4.56)	.0000
Employed (% no)	42.9 (0.23)	50.1 (0.98)	67.9 (3.89)	.0000
Health insurance (% no)	10.3 (0.14)	11.7 (0.70)	17.4 (3.48)	.0000
Place most often receive care				.0008
Clinic/health center	14.8 (0.24)	12.5 (0.69)	17.3 (3.42)	
Doctor's office/HMO	83.0 (0.25)	84.5 (0.75)	77.6 (3.98)	
No usual source of care	2.2 (0.07)	3.0 (0.33)	5.1 (2.61)	
Current smoker (%no)	57.0 (0.23)	63.5 (0.88)	81.3 (3.54)	.0000
Body mass index				.0000
Normal	46.7 (0.20)	50.8 (0.89)	52.0 (4.06)	
Overweight	25.6 (0.15)	27.4 (0.82)	22.2 (3.03)	
Obese	27.7 (0.18)	21.8 (0.81)	25.8 (3.77)	
Length of time in United States				.0000
U.S. born	100.0 (0.00)	–	–	
<15 years	–	30.5 (0.99)	52.6 (4.87)	
≥15 years	–	69.5 (0.99)	47.4 (4.87)	

Abbreviations: HMO, health maintenance organization; HS, high school; NHIS, National Health Interview Survey.

Age-adjusted analyses of not receiving preventive health vaccines and cancer screenings are reported in Table 2. Foreign-born Arab-American women were less likely to report receiving a flu vaccine, pneumonia vaccine, mammogram, Pap smear, and clinical breast examination when compared with U.S.- and foreign-born White women from Europe (all $p \leq .00$). The greatest disparities found included estimates of not receiving pneumonia vaccine (78% vs. 89%) Pap smear (5% vs. 16%) and clinical breast examination (11% vs. 34%) between U.S.-born and foreign-born Arab-American women, respectively.

Multivariable analyses are reported in Table 3. Using crude models (Model 1), foreign-born Arab-American women were less likely to report having the flu vaccine (odds ratio [OR], 0.48; 95% CI, 0.32–0.72), pneumonia vaccine (OR, 0.29; 95% CI, 0.15–0.56), mammogram (OR, 0.47; 95% CI, 0.27–0.84), Pap

smear (OR, 0.21; 95% CI, 0.11–0.39), and clinical breast examination (OR, 0.27; 95% CI, 0.11–0.61) when compared with U.S.-born White women. Results were no longer significant for mammography when adjusting for demographic variables (OR, 0.64; 95% CI, 0.35–1.19).

Discussion

The purpose of this study was to estimate and compare the age-adjusted prevalence of not receiving recommended vaccines and cancer screenings among U.S.- and foreign-born White women from Europe and the Arab Nations. This study also examined the association between region of birth and recommended vaccines and cancer screenings before and after controlling for potential confounders. Compared with U.S.-born White women, foreign-born Arab-American women reported 1) lower flu and pneumonia vaccine uptake, 2) lower estimates of Pap smear and clinical breast examinations, and 3) no differences in mammography use.

Selected Characteristics of Arab-American Women

We found that Arab-American women were younger, and more likely to be married and have higher education levels than U.S.- and European-born counterparts. Although education levels were higher, Arab-American women were more likely to report unemployment, incomes below the poverty level, no health insurance, and no usual source of care. These characteristics are similar to results found in population and community-based studies on Arab-American health (Read et al., 2005; Schwartz et al., 2008). Although several of these factors may play a role in lower vaccinations and cancer screenings, our

Table 2Age-adjusted Prevalence of Not Receiving Preventive Health Behaviors of U.S.- and Foreign-Born White Females from Europe and the Arab Nations, NHIS 2000–2011 (*n* = 117,893)

	Non-Hispanic Whites			<i>p</i> Value*
	U.S. Born (<i>n</i> = 113,406)	Foreign Born		
		Europe (<i>n</i> = 3,744)	Arab Nations (<i>n</i> = 205)	
Flu vaccine	64.0 (0.00)	71.0 (0.01)	74.0 (0.03)	.0000
Pneumonia vaccine	78.0 (0.00)	84.0 (0.01)	89.0 (0.03)	.0000
Mammogram [†]	23.0 (0.00)	27.0 (0.01)	28.0 (0.04)	.0000
Pap smear [‡]	5.0 (0.00)	13.0 (0.01)	16.0 (0.04)	.0000
Clinical breast examination [‡]	11.0 (0.00)	22.0 (0.02)	34.0 (0.10)	.0000

^a All *p*'s significant.[†] Five years of data analyzed: 2000, 2003, 2005, and 2010.[‡] Three years of data analyzed: 2000, 2005, and 2010.

Table 3

Crude and Adjusted Odds Ratios (95% CIs) for Preventive Health Behaviors among the Female Foreign-Born White Population, 2000–2011 (n = 117,893)

	Model 1 (Crude) [†]	Model 2 (Demographic Effects) [‡]	Model 3 (Socio-economic Effects) [§]	Model 4 (Health Access Effects)	Model 5 (Risk Factor Effects) ^{*‡}	Model 6 (Acculturation Effects) [#]
U.S. Born	1.00	1.00	1.00	1.00	1.00	1.00
Flu vaccine						
Foreign born						
Europe	0.82 (0.75, 0.90) [*]	0.76 (0.69, 0.83) [*]	0.73 (0.66, 0.80) [*]	0.75 (0.68, 0.83) [*]	0.75 (0.68, 0.83) [*]	0.48 (0.38, 0.60) [*]
Arab Nations	0.48 (0.32, 0.72) [*]	0.54 (0.36, 0.81) [*]	0.50 (0.33, 0.76) [*]	0.52 (0.33, 0.81) [*]	0.51 (0.32, 0.79) [*]	0.34 (0.21, 0.58) [*]
Pneumonia vaccine						
Foreign born						
Europe	0.83 (0.75, 0.91) [*]	0.72 (0.65, 0.80) [*]	0.66 (0.59, 0.74) [*]	0.68 (0.61, 0.77) [*]	0.69 (0.61, 0.77) [*]	0.43 (0.28, 0.64) [*]
Arab Nations	0.29 (0.15, 0.56) [*]	0.34 (0.17, 0.65) [*]	0.23 (0.11, 0.46) [*]	0.21 (0.10, 0.44) [*]	0.21 (0.10, 0.45) [*]	0.14 (0.06, 0.32) [*]
Mammogram						
Foreign born						
Europe	0.87 (0.75, 1.02)	0.78 (0.64, 0.95) [*]	0.80 (0.65, 0.97) [*]	0.89 (0.72, 1.10)	0.90 (0.73, 1.11)	0.62 (0.44, 0.86) [*]
Arab Nations	0.47 (0.27, 0.84) [*]	0.64 (0.35, 1.19)	0.76 (0.40, 1.45)	0.72 (0.36, 1.43)	0.74 (0.37, 1.46)	0.50 (0.25, 1.00)
Pap Smear						
Foreign born						
Europe	0.38 (0.31, 0.48) [*]	0.27 (0.21, 0.35) [*]	0.27 (0.21, 0.34) [*]	0.27 (0.21, 0.36) [*]	0.29 (0.22, 0.39) [*]	0.17 (0.11, 0.25) [*]
Arab Nations	0.21 (0.11, 0.39) [*]	0.15 (0.07, 0.35) [*]	0.14 (0.07, 0.29) [*]	0.17 (0.07, 0.38) [*]	0.20 (0.09, 0.44) [*]	0.13 (0.05, 0.31) [*]
Clinical breast examination						
Foreign born						
Europe	0.46 (0.37, 0.56) [*]	0.46 (0.37, 0.56) [*]	0.46 (0.38, 0.57) [*]	0.47 (0.37, 0.58) [*]	0.47 (0.38, 0.59) [*]	0.29 (0.19, 0.45) [*]
Arab Nations	0.27 (0.11, 0.61) [*]	0.26 (0.11, 0.59) [*]	0.26 (0.12, 0.60) [*]	0.23 (0.10, 0.51) [*]	0.24 (0.11, 0.54) [*]	0.16 (0.07, 0.37) [*]

* p < .05.

† Unadjusted, crude estimates.

‡ Adjusts for age (<45 years as referent) and marital status (married as referent).

§ Adjusts for variables in model 2 plus education (Bachelor's degree or higher as referent), employment (employed as referent) and poverty ratio (≥200% as referent).

|| Adjusts for variables in model 3 plus health insurance coverage (yes as referent) and place most often received care (doctor's office/health maintenance organization as referent).

*‡ Adjusts for variables in model 4 plus smoking history (no as referent) and body mass index (normal as referent).

Adjusts for variables in model 5 plus years in the United States (U.S. born as referent).

multivariate analysis adjusted for these factors and our results were significant.

Flu and pneumonia vaccine research

In the current study, foreign-born Arab-American women reported lower estimates of flu and pneumonia vaccines when compared with their U.S.-born counterparts. Limited research has evaluated flu and pneumonia vaccine patterns among foreign-born adults on a global scale, none of which has focused on nativity status among White women. [Wershof Schwartz and colleagues \(2013\)](#) evaluated flu and pneumonia vaccine disparities among older foreign-born adults in Israel. Results indicated that recent immigrants and women had lower estimates of vaccine uptake compared with native born and men.

[Lebrun \(2012\)](#) evaluated foreign-born adults in Canada and the United States and found there were no differences in receipt of a flu vaccine between foreign-born adults living in the United States fewer than 10 years versus 10 years or longer. However, foreign-born adults with lower English proficiency were 22% less likely to report obtaining a flu vaccine in the last year compared with English-proficient immigrants. Our study adjusted for duration in the United States, but we were not able to include a variable on language proficiency because the NHIS evaluated language proficiency among Hispanics only, and this ethnic group was not the focus of our study.

[Vlahov, Bond, Jones, and Ompad \(2012\)](#) evaluated access, attitudes, and beliefs about flu vaccines in Harlem and South Bronx communities. Regardless of whether they had access to a health care provider, foreign-born adults were four times more likely to express lack of interest in getting the seasonal flu vaccine. Information about attitudes, beliefs, knowledge, or similar

characteristics as they relate to vaccine use would be useful to collect on future research among Arab Americans.

Pap smear, mammogram, and clinical breast examination research

In the current study, foreign-born Arab-American women reported lower estimates of Pap smears and clinical breast examinations, but no differences in mammography use, compared with their U.S.-born counterparts. Previous studies evaluating immigrant women's cancer screening behaviors have produced similar results. [Lebrun \(2012\)](#) demonstrated that foreign-born women living in the United States fewer than 10 years (vs. ≥10 years) were 38% less likely to report having a Pap smear in the last 3 years. However, foreign-born women with lower English proficiency were 57% more likely to report having a Pap smear in the last 3 years compared with English-proficient immigrant women ([Lebrun, 2012](#)). Based on these findings, it seems that shorter duration in the United States had a negative effect on Pap smear use, whereas lower English proficiency had a positive effect on Pap smear use. One explanation may be that it takes time for foreign-born women to feel comfortable in their new country, find a trustworthy and sex-and race-concordant physician to care for them ([Aboul-Enein & Aboul-Enein, 2010; Kulwicki, Miller, & Schim, 2000; Obeidat, Amarin, & Alzaghal, 2011](#)). English proficiency, however, is not always related to duration in the United States. For example, there are some immigrants who have been in the United States for longer than 10 years and may not speak English ([Lebrun, 2012](#)). Perhaps women with lower English proficiency are more likely to be compliant with their physician's recommendations versus someone with a higher English proficiency, who may obtain a second opinion or educate herself about the Pap smear guidelines.

Singh and Hiatt (2006) found that foreign-born White women were 37% less likely to report having a Pap smear in the past year in adjusted models when compared with U.S.-born White women. In adjusted analyses, there were no differences in mammography use when comparing U.S.-born with foreign-born White women (OR, 0.86; 95% CI, 0.64–1.15). Again, these results parallel our findings, with the exception that our study expands the definitions of White “race” into its subparts.

In Michigan, studies have evaluated cervical and breast cancer screening estimates among Arab-American women compared with the general population. Arab-American women reported lower estimates of ever having a Pap smear (93.1%) compared with the general population (99.2%). Arab-American women reported lower estimates of clinical breast examinations (81.7%) compared with the general population (86.0%). Arab-American women (86.3%) reported higher estimates of mammography use compared with the general population (85.3%; Michigan Cancer Consortium, 2010). This report did not provide estimates for White women only; therefore, we compared the Arab-American estimates with the general population. The findings of the study by the Michigan Cancer Consortium cannot be compared directly with our results because their study did not provide separate estimates for foreign- versus U.S.-born women.

A potential barrier to vaccines or cancer screening uptake among Arab Americans is cultural context. Aboul-Enein and Aboul-Enein (2010) evaluated Arab Americans' perspectives on health care and suggested that preventive care is generally not practiced among Arab Americans. Moreover, several qualitative studies have been conducted to evaluate screening barriers among Arab-American women (Kawar, 2012; Salman, 2012; Schwartz et al., 2008). Kawar (2012) investigated barriers to breast cancer screening for Jordanian and Palestinian women in the United States. Results of the study revealed cultural factors such as embarrassment, fatalism, the use of traditional healers, citizenship and language issues, stigmatization of cancer, and ignorance about cancer screening as major barriers to breast cancer screening. Salman (2012) explored participation in breast and cervical cancer screening among immigrant Arab-American Muslim women. The qualitative findings were similar to Kawar's study, with additional barriers of transportation, lower income, older age, and not having a referral from their physician (Salman, 2012). The study by Schwartz and colleagues (2008) indicated that women who did not receive a mammogram were more likely to have no education, be unmarried, have no health insurance, have been in the United States for 0 to 10 years, and originate from Iraq (Schwartz et al., 2008). Shah, Ayash, Pharaon, and Gany (2008) found that women were modest and did not feel comfortable discussing gynecologic care if they were forced to bring their husbands into the examination rooms as interpreters if a non-Arabic-speaking provider was not available. In our study, we controlled for factors such as education, marital status, and others, because the main objective was to compare screening estimates between U.S.- and foreign-born White women. Barriers identified by Shah and colleagues (2008) included many of the barriers identified above in addition to societal discrimination and difficulty in navigating the complexity of the health care system.

Researchers have garnered important information from the studies cited, which may help to explain the findings in the current study. Knowledge-based interventions in Michigan have been successful at increasing Arab-American women's knowledge of clinical breast examinations and mammography;

however increased breast cancer screenings were not reported in that study (Williams et al., 2011). Comprehensive health forums in Michigan have been shown to be effective at increasing cancer screening estimates. For example, among Arab-American women who attended a cancer forum, 13.1% obtained a mammogram and 12.5% received a Pap smear (Vicini et al., 2012). Similar educational forums may be useful in increasing screening estimates for other preventive behaviors, such as flu vaccines, pneumonia vaccines, and clinical breast examinations.

Our study has several strengths and limitations. Among the strengths of this study is the use of 12 years of a national representative sample with a large sample size, which allows the ability to control for numerous potential confounders. Furthermore, this study builds on existing research evaluating Arab Americans using restricted data from the NHIS. This study unmasks differences that may not be discovered when evaluating foreign-born adults from the Middle East region of birth as a proxy for Arab Americans. Previous research evaluating the health of foreign-born Arab Americans is limited by including respondents who reported that they were not born in the United States and were born in one of the 25 countries included in the Middle East region variable. Only 15 of the 25 countries included in the Middle East region variable are part of the Arab League of Nations. The use of self-reported data is a limitation to our study. However, studies have shown that self-reported data for preventive health behaviors may be consistent with medical audits of vaccines (Grimaldi-Bensouda et al., 2013; Llopia et al., 2012), cervical and breast cancer screenings (Rauscher, Johnson, Cho, & Walk, 2008). Another limitation is the difference in sample size among the foreign-born population (Europe = 3,744; Arab Nations = 205). Nevertheless, the NHIS complex sampling methods are designed to represent the national population distribution. The small sample size of Arab-American women also limited our ability to evaluate other vaccines and cancer screening measures, including human papillomavirus vaccines and colon cancer screenings.

Implications for Policy and/or Practice

This study using national data suggests that Arab-American women are less likely to receive flu or pneumonia vaccines compared with U.S.-born non-Hispanic White women. The findings move forward the discourse on Arab-American health and the importance of disaggregating Arab Americans from the non-Hispanic White population because of differences in their health behaviors. Given that there is a large and increasing Arab-American population in Michigan, the state should adopt policies that identify Arab Americans as a separate category, or at least a subgroup under the White category under the Office of Management and Budget guidelines. In practice, some of the potential barriers discussed herein should be addressed when vaccines and screenings are offered to Arab-American women. Future research should collect qualitative data to better understand attitudes, behaviors, and knowledge as they relate to preventive health behaviors among Arab-American women.

This study was conducted using restricted data from the NHIS. The results and conclusions in this paper do not necessarily represent the views of the Research Data Center, the National Center for Health Statistics, or the Centers for Disease Control and Prevention (National Center for Health Statistics, 2012c).

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